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ANALOGICAL REASONING, MOBILITY OF ATTENTION AND THEIR LINK WITH PSI IN JUNIOR HANDBALL TEAMS

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Abstract. *The evaluation of analogical transfer/ reasoning is an important component of intelligence assessments (intelligence represents the capacity to resolve problems being considered a general ability that accounts for the covariation of many specific competences). Attention represents the control system of the brain and plays an important role in the production of skilled, clever or acute behaviors and thoughts. Attention is the gateway to cognition (which, in general is considered to include thinking, reasoning and planning). The present research focused on identifying important cognitive abilities of the informal leaders in the case of adolescent female handball players. 30 athletes (mean age = 14.33 years, SD = .48) from two different handball teams from Romania, participated at the study. Each team included 15 athletes and represented the reference group within which the preferential status index (PSI) was calculated. The instruments used were the Analogical Transfer Test (Analogical Transfer for verbal content and Analogical Transfer on figural content) - assesses a person's ability to apply previously accumulated knowledge to new situations, the CMA Test (mobility of attention and concentration test) and the sociometric test to determine the stage in which individuals are accepted in a group. Considering the adolescent handball players, using the Pearson correlation there have been significant relations underlined between the results obtained for analogical transfer, attention performance coefficient and the PSI. The importance of verbal and nonverbal analogical transfer capacities and the importance of attention mobility and concentration (as specific features of the informal leaders) were discussed.*

Keywords: *analogical reasoning, attention, sociometry, informal leader, handball.*

Introduction

The sports team, like a work team, is a group characterized by human relationships, cohesion, personal involvement, supportive effort and an effort to abstain (self-control, self-mastery) in order to achieve a common result (Predoiu, 2016, p. 125). In a team, leaders inspire pride, increase optimism, help others to achieve maximum potential, develop members' thinking and imagination, and also, provide new ideas to determine re-evaluation of the situation (Zlate, 2004). Those members who exert influence and make decisions are perceived as being popular by the group (Cillessen, Schwartz and Mayeux, 2011, p. 11). In order to understand the dynamics of the relationships between the female athletes the sociometric method was used. Northway (1964) considers the sociometric test a means to determine the stage in which individuals are accepted in a group, to discover the relationships between these individuals and to reveal the structure of the group itself. More recent sociometric studies (Rubin, Bukowski and Laursen, 2011, p. 82) established that there is a distinction between *sociometric measures* of interpersonal attraction (liking and disliking) and *peer assessments* of behavior and reputation (performance, competence or abilities). Our study investigates the "task-specialist" characteristics, trying to find an answer to the question: what intellectual capacities conspire to make an athlete popular or rejected in a handball team? Specialized literature describes different personal qualities of the leaders. For example, House (1977, p. 190) discussed about the following attributes: dominance, self-confidence, the need to influence others, the ability to clarify the purposes in the activity, communication of high expectations and the capacity to activate the need for achievement in the case of group members. Marcus (2000) mentions among the abilities of a leader the capacity to communicate the emotional experiences, self-monitoring of the affective behaviour, emotional stability, empathy, extraversion and goal orientation, whereas Den Hartog and Koopman (2001, p. 168) are talking about the need for power, confidence in his own beliefs, intelligence, interpersonal skills and oratory skills. But what about the analogical transfer capacity - key component of intelligence which allows athletes to effectively transfer knowledge acquired in a specific context (for example in the training process) or in new situations (e.g., in sport competition)? Also, the mobility of attention and concentration are significantly important in order to facilitate the obtaining of a higher preferential status index (PSI) in a sport group (particularly in a handball team)? Our paper aims to answer these questions. We choose to investigate the analogical reasoning capacity, mobility of attention and concentration, knowing that such cognitive skills are essential in the sport field, in order to obtain higher performances in competitions (Predoiu, Ramsey and Arsenescu, 2016; Grigore et al., 2016). We mention also Wentzel and Ramani (2016, p. 16) who argued that expanding the range of the studies on children and adolescents that include cognitive processes (attention, intelligence, working memory, problem-solving skills etc) is considered to be a welcome addition to the field of education.

The evaluation of analogical transfer is an important component of intelligence assessments. Examination tests of this ability are included in complex intelligence tests (Miclea et al., 2009, p. 52): WAIS III, Wechsler, 1981; Raven; Test of Nonverbal Intelligence, second edition - TONI-2; RIAS; SON-R 2,5-7 and SON 5,5-17 years. Analogical transfer involves a set of challenging processes: the enhancement of problem solving experience, the establishment of similarity between two problem solving situations, the structuring of large amounts of knowledge so that information may be retrieved efficiently when needed, and also, the successful transfer of steps of reasoning from previously solved problems to new ones, when a match exists among them (Veloso, 1994, p. 2). An analysis of the process of analogical reasoning (Gick and Holyoak, 1983) states that analogies can be identified on the basis of semantic retrieval cues and that the induction of a general schema will facilitate analogical transfer. As highlighted in the studies (Gentner and Kurtz, 2006; Nokes, 2009) an analogy can be established in many ways: the target and the analogue source can have similarities on the surface (matching object features and context), structurally (matching relations between objects), or both (matching objects and relations).

Supporting experimental data (Palleta and Rome, 2007, p. 22) justifies the fact that attention is the gateway to cognition (which, in general is considered to include thinking, reasoning and planning). Attention can be seen as a feature of cognition appearing to be a ubiquitous attribute, also, in perceptual experience (Wu, 2011, p. 98). Attention represents the control system of the brain and plays an important role in the production of skilled, clever or acute behaviors and thoughts – attended things may be seen more clearly or acted on more accurately, remembered more intensely or understood more subtly (Mole, 2011, p. 88). Recent research (McBride and Cutting, 2016) highlights that attention works to filter out the irrelevant stimuli from the environment in a manner that the only aspects left in our consciousness are those we choose to pay attention to. As a parameter of attention, mobility (inevitably, concentration is also involved) currently refers to switching attention from one stimulus to another, implying the focusing of cognitive resources toward the specific demands of the task (Aminoff and Daroff, 2014, p. 307). Concerning the field of sport, studies showed that athletes who perform at suboptimal levels tend to register poor performances in the case of attention (Tüdös, Predoiu and Predoiu, 2015).

The present research focused on identifying important cognitive abilities of the informal leaders in the case of adolescent female handball players. We *hypothesized* that adolescent female handball players with high scores considering the PSI would demonstrate significantly better results in the case of verbal and nonverbal analogical transfer capacity and in the case of attention mobility and concentration.

Materials and methods

Participants

A sample of 30 adolescent handball players, aged between 14-15 years old (mean age = 14.33 years, $SD = .48$ years) from two different Romanian handball teams have participated at the research. Each team included 15 female athletes, legitimated at Scholar Sports Club No. 6, Bucharest, and constituted the *reference group* within which the preferential status index (PSI) was determined. In the case of the adolescent athletes, the junior handball players accumulated a training experience comprised between 6 and 7 years and some of them are part of the Romanian Junior National Handball Team.

Instruments

Analogical Transfer Test is part of the computerized platform of psychological assessment CAS⁺⁺, created by the Romanian company Cognitrom, which can be successfully applied to the adolescents. The Analogical Transfer test (for 12-17 years old) assesses a person's ability to apply previously accumulated knowledge to new situations. The test comprises two subscales: Analogical Transfer for verbal content (assessing the transfer of declarative/ verbal knowledge) and Analogical Transfer on figural content (assesses the transfer of figural/ nonverbal knowledge). The test was administered collectively as paper-and-pencil. The duration was 5 minutes for Analogical Verbal Transfer Test and 4 minutes for Analogical Nonverbal Transfer Test. The final result comprised the scores obtained for both subscales. An example of a question from the Analogical Verbal Transfer subtest is the following: "Glove is for the Hand what Shoe is for: Head-Leg-Sock-Trousers".

The CMA (Attention Mobility and Concentration) Test is a computerized test designed as a dynamic model with gradual increasing levels of difficulty. Displayed images contain four squares, placed as follows: one in the center (the model-square) and three underneath it, on the horizontal. Within each square, two, three, four or five triangles are positioned, depending on the progressive level of difficulty. At settled intervals, through a rotating

movement, the triangles from inside of the squares shift their position. After a short time, the movement ends – that represents a signal-stimulus. The participant's task is to respond when the triangles within the squares stop moving by selecting the square which has the same content like the model-square, from the three squares placed on the horizontal. Answer apparatus: a lever with three buttons. The coefficients provided by the battery soft are: attention efficiency (an indicator which reveals the correctly issued answers) and the attention performance (statistically calculated by reporting the correct responses - attention efficiency, to the test time).

Procedure

To establish the informal leaders we used the peer nominations procedure (the sociometric technique). We investigated 15 athletes at a time (a team). After the peer assessment of reputation, in terms of performance, competence and abilities, the preferential status score was calculated, for each athlete. The questions used in our research (after obtaining the participants' consent) were: "Who would you choose to have on your team?" and "Who you wouldn't choose to have on your team?" (both in the case of handball competition). We mention that athletes know each other well enough (playing and training for at least a year together). The instructions were: „You are all part of a handball team. We would like you to respond to the next questions: *Who would you choose to have on your team in a handball competition?* [*Who you wouldn't choose to have on your team in a handball competition?*] For each question please nominate three teammates: the teammate you are writing first receives 3 points, being the best player in the team (respectively -3 points in the case of the rejected teammate, who is the weakest player in the team), the second teammate you are writing receives 2 points (respectively -2 points), while the third teammate receives 1 point (respectively -1 point). There are no right or wrong answers". Throughout this process the athletes had the opportunity to withdraw at any moment, there were no constraints, data has been treated confidentially and the participants remained anonymous.

The limited three nominations procedure has been used throughout years of research (Coie, Dodge and Coppotelli, 1982; Newcomb and Bukowski, 1983) supporting the idea that a higher contribution to the data is given by the more selective "voters" (restricted to a specific number) than the less selective ones – unlimited nomination approach.

Starting from the matrix of sociometric choices within each sports team was possible to calculate the preferential status index (Predoiu, 2016, p. 151) and to identify: the informal leaders (the female athletes with the higher scores regarding the PSI), the controversial athletes (they received the same moderate number of positive and negative nominations by their peers), the neglected athletes (they weren't nominated at any question) and the rejected ones (athletes with negative values for the PSI)

Experimental design

Considering the adolescent female handball players, the PSI had the role of the dependent variable, whereas the results obtained by the athletes at Analogical Transfer (verbal and nonverbal) and CMA Tests had the role of the independent variables.

Results

Preliminary data investigation (box-plot charts) highlighted that, in the case of the performances obtained by the female athletes at Analogical Transfer, CMA Tests, there were no extreme values found (which can negatively influence the study results).

Importantly, and in support of our hypothesis, using the Pearson (r) correlation (which measures the tendency of simultaneous variation between two variables) there have been important relations underlined between the results obtained for analogical transfer capacity, attention performance coefficient and the PSI (table number 1). We mention that the conditions for the application of the Pearson correlation were fulfilled: both variables are quantitative; the variables are normally distributed (applying the Shapiro-Wilk test of normality, the data distribution for all the variables was normally distributed, $p > .05$) and the relation between variables is linear (the cloud of points indicating that homoscedasticity is assured).

Table 1. Results for Analogical transfer capacity, CMA (Attention mobility and concentration) and the PSI in the case of adolescent handball players

Variables	Athletes	Mean	STD	SE	PSI Pearson Correlation
Analogical transfer	30	28.67	6.82	1.24	.589**
Attention performance coefficient	30	116.73	15.46	2.82	.528**
Attention efficiency coefficient	30	87.33	7.38	1.34	.233

** . Correlation is significant at the .01 level (2-tailed).

* . Correlation is significant at the .05 level (2-tailed).

The analysis of the results registered in table number 1 underlines that there is a positively significant correlation ($r = .589$) between the scores obtained by the adolescent handball players for analogical transfer capacity and the PSI ($p < .05$). It means that female handball players who registered high performances for the analogical transfer ability obtained high scores concerning the preferential status index (also, small values for PSI are corresponding to low scores for analogical reasoning). As for correlation, an indicator for the effect size index is the determination coefficient, whose value is $r^2 = .35$. We can say that 35% of the variation of the two variables is common, the rest being due to other influences. This means that the relation between the results obtained by the athletes for analogical transfer capacity and the preferential status index (assessed through peer nominations), in the case of adolescent athletes, is strong. The confidence interval for the correlation coefficient (95%) is between .29 (lower limit) and .78 (upper limit). Also, we emphasized a positively significant correlation ($r = .528$) between the attention performance coefficient and the PSI ($p < .05$). We can assert that superior performances in the case of the ability to offer correct responses to visual stimuli in a short period of time are linked to enhanced scores for PSI. The value of the determination coefficient is $r^2 = .28$, indicating that the relation between the attention performance coefficient and the preferential status index is strong. The confidence interval for the correlation coefficient (95%) is between .20 (lower limit) and .74 (upper limit). Regarding the attention efficiency coefficient (which reveals the correctly issued answers in tasks requiring attention mobility and concentration), no correlations with the PSI values were revealed ($p > .05$).

Discussions and conclusions

Consistent with our hypothesis, regarding the adolescent handball players, the study results revealed that there are positively significant correlations between the investigated intellectual dimensions (analogical transfer, attention mobility) and the values of the preferential status index. Based on our research findings we can argue that if athletes give more correct and faster responses in tasks claiming mobility and concentration of attention and less failed answers for the assignments implying analogical transfer abilities, these aspects are related with high values for PSI, hence with affiliation to the “popular” group (in the case of a sociometric assessment in terms of the sport-related competence). The importance of verbal and nonverbal analogical transfer capacities (as specific features of the informal leaders) can be explained by the fact that analogical reasoning speed, the learning of new rules/schemata and the knowledge base becomes more flexible (Grigore, Mitache and Predoiu, 2016). We mention also, that usually, the transfer mechanisms interact (Nokes, 2009) – people (also athletes) often use a mixture of multiple transfer processes: analogy, knowledge compilation (Andersen, 1982) and constraint violation (Ohlsson, 1996; Ohlsson, Ernst and Rees, 1992). Thus, in a handball competition all three mentioned transfer mechanisms interact: athletes are learning through analogy, while through knowledge compilation can interpret data, instructions, advices, into a set of procedures, in order to solve new problems on the court. When the declarative data are no longer applicable to the reality of the game, the constraint violation will be triggered – the athletes use prior knowledge considering the handball domain constraints (do not hit the ball towards the opponent or outside the court etc), in order to correct (and evaluate) the performances. Specific procedures (executions, movements) will be generated by the handball players and then evaluated and again, new procedures will be generated (when faulty procedures are noticed) and revised until, eventually, the athletes learn specific executions/ procedures regarding what move to make in competition, in specific situations. Consequently, the evolution of an athlete in

competition may be positively influenced, as well as the social perception of the handball player after a sociometric assessment in terms of the sport-related competence, by developing the mechanisms of transfer.

In the case of adolescent female handball players, through specific training and programs consisting of attention mobility and concentration exercises, tasks demanding verbal and nonverbal analogical reasoning skills, specialists (coaches and sport psychologists) can contribute also to a successful social integration of the neglected and rejected athletes in the handball team (social perception can be modified).

Considering the psychophysical condition of the participants during testing, which can cause variations in response time, alertness, variations in the ability to process relevant data, observation and conversation as research methods (used before and during testing) support the value of our research. Our research is an open matter and a challenge for field specialists, as it may be revised and extent (e.g., another strategy would be to investigate the role of cognitive inhibition, working memory, creativity, the importance of motivation, reaction time, speed and distance estimation, coordination, spatial orientation or balance, in acquiring the informal leader status).

Authors' Contributions

All authors contributed equally to this study.

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DEVELOPING THE CAPACITY OF ATTENTION AND CONCENTRATION BY PRACTICING PHYSICAL EXERCISES

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Abstract. *An increased capacity of attention and concentration facilitates and ensures the learning process in any field. Handball, like all sports games, requires distributive attention and concentration not only for practising the game itself but also for absorbing the information coming from the outside. The handball initiation process needs attention and concentration. The present study is an observational one having the main objective to develop the capacity of attention and concentration in 6-year-old children by practising physical exercises considered playful and collective stimuli that aim both at the improvement of the motor level and the increase of the focusing and concentration ability. The research was conducted on a mixed experimental group consisting of 20 children, belonging to the first grades of the Al Nahda National School, in Abu Dhabi. The formed group trained three times a week, for 80 minutes according to a pre-established training program. Following the Progressive Coloured Matrices Test and the interpretation of the initial and final results, the hypothesis confirmed the fact that the exercises which are constantly practised in an organized setting contributes to the improvement of the capacity of attention and concentration.*

Keywords: *attention, concentration, physical exercise.*

Introduction

The importance of attention in the learning process is highlighted by Epuran, Holdevici and Tonița (2001, p. 329), which consider it a “basic condition of awareness of the entire psycho-behavioural life without which no external or internal information is received or effectively processed”. Concentrated attention is educated in the process of information acquisition and skill training, through voluntary and conscious guidance on the cognitive (perception, thoughts), affective and bodily activity, as well as on what appeared in the field of consciousness. Practising any kind of sport activity requires a certain level of attention and intelligence. The process of initiation in handball involves the stimulation of the qualities of attention, namely, “concentration, distribution, volume and movement, necessary qualities that condition the efficiency in learning and in the actual activity” (Nicu, 2002, p. 62). In team sports, attention is decisive in achieving sports results and implies a “psycho-behavioural adaptation, a way of organizing the psycho-physiological activity consisting in the hierarchy of trends, some being promoted and some retained” (Popescu Neveanu, 1978, p. 70). It is important in a child’s / human’s evolution to focus on perceiving, understanding and retaining information, but also to be able to use information in practice. In sports practice, the preoccupation for educating attention aims at “a practical correspondence, valorising it as much as possible at the level of the material and spiritual development” (Cerghit, 2006, p. 243). Learning is performed as a basis in the educational system, and “the accumulation of (new) social and individual experience, the formation of the psychic structures is one of the fundamental forms of human activity that together with the adaptive changes” (Șchiopu and Verza, 1997, p. 33), ensuring the formation of the human behaviour capable of living in society. “Attempting to assimilate information ... through the filters that allow analyzers to sort and select information entering the system ... is what we call attention” (Smith et al., 2005, pp. 213-218). Attention in any activity, as well as in handball, allows a child to know the world through sensations and perceptions. Perception is not only important for motor development, it is also at the basic cognitive sensory development and represents “the primary sensory cognitive process that symbolizes the objects and phenomena in all their attributes” (Epuran, 1999) and through which knowledge of the surrounding world is realized”. The present study is observational, having as main objective the development of the attention concentration capacity in the 6-year-olds, by practising physical exercises as playful and collective stimuli that aim at both the improvement of the motor level and the increase of the capacity of attention and concentration. The focus of attention, in the practical lessons on the aspects to be retained and realized, involves the choice of “among the many phenomena presented simultaneously, of the one that is important for the child or is imposed by its qualities, and concentration means development, thoroughgoing study, insistence on the phenomenon, or on the respective activity” (Epuran, 1963, p. 25). In sport, the transmission and reception of information is undermined by “the so-called” noise, and listening must be active, meaning careful” (Rață, 2008, p. 155).

Materials and methods

This research had as a *purpose* to highlight the development of the capacity of attention and concentration by practicing physical exercise, underlined by the “Coloured Progressive Matrices” Test, which can be easily completed by children. In sports, the knowledge of the group level from which the activity starts, namely the knowledge of the psychosomatic and functional characteristics of the children, is essential for establishing the objectives and the training plan, but also for the realization and application of an individualized educational approach for a certain training period. The *research hypothesis* started from the assumption according to which constantly practised physical exercises in an organized environment contributes to the improvement of attention concentration capacity. The main *training objectives* were the following: to develop specific motor skills specific to the handball technique, to develop motor skills (especially speed and coordinated capability), to increase the concentration and attention capacity. The present study is observational, having as a main *task* the development of the capacity of attention and concentration in 6-year-old children, by practising physical exercises (as playful and collective stimuli). In this research we used the following research methods: bibliographic study, pedagogical observation, statistical-mathematical method, data analysis and interpretation. The research was conducted on a mixed experimental group consisting of 20 subjects (children, 10 girls and 10 boys), their average age being 6.57 years (a standard deviation of 0.67 years), heterogeneous from an ethnic and nationality point of view, in the first grades at the Al Nahda National School, Abu Dhabi. In order to know the level of attention and concentration, as important processes in the training activity, and for verifying the hypothesis, we used as *assessment method* the Coloured Progressive Matrices Test (C.P.M.), which was applied twice, at a 6-month distance (at the beginning of October 2016 and the end of March 2017).

The *Coloured Progressive Matrices* (according to Zaharnic et al., 1974) is a non-verbal test that aims at examining the intellectual level, the clarity of the observation capacity and the quality of the persons' concentration. The test is composed of brightly coloured images, presented under the form of an individual notebook. It comprises 36 drawings- divided into three groups of 12 matrices each, series A, AB and B. The test is composed so that the student evolves from an intellectual point of view from simple tasks to complex tasks. Each student will receive a brochure with Raven boards and get an explanation of the images on the paper and how he has to choose the correct image from the 6 displayed below. The examiner must ensure that the example and explanations are sufficiently accurate so that a 6-year-old child should understand the tasks of the test. The children will receive an answer sheet where each question will have 6 boxes with numbers from 1 to 6, representing the images at the bottom of each Raven board. The children have to cut the correct answer with an oblique line. If they do not know the answer, they are asked not to fill in anything. The test will work from top to bottom along each column in the order of A to B. No extra help is given to children and the subject's choices are not commented. Quoting and interpretation rules: for each correct answer, 1 point is awarded. The total quota is obtained by summing up all the points made by the subject, according to the following ranking scale (table 1):

Table 1: *Correct answers to the C.P.M.*

Item	1	2	3	4	5	6	7	8	9	10	11	12
A	4	5	1	2	6	3	6	2	1	3	4	5
AB	4	5	1	6	2	1	3	4	6	3	5	2
B	2	6	1	2	1	3	5	6	4	3	4	5

In order to assess the obtained information, we interpreted the results in two ways: a quantitative interpretation, allowing the identification of the degree of intelligence by calculating the number of obtained centils (see table number 2) and a qualitative interpretation, by assessing the efficiency of the intellectual activity during the test, respectively the subject's ability to maintain the degree of concentration and attention throughout the test period.

Table 2: *Sample with the number of centils corresponding to the number of points accumulated*

Centils	SCORES BY AGE CATEGORIES				
	6 YEARS	7 YEARS	8 YEARS	9 YEARS	10 YEARS
10	11	12	14	15	16
20	12	13	15	16	17
30	13	14	16	17	20
40	14	15	17	19	22

50	15	16	18	21	24
60	16	17	20	22	25
70	17	19	22	23	26
80	18	21	24	24	28
90	20	24	26	27	29
100	23	26	28	28	33

For a more accurate interpretation, taking into account the occurrence of some fluctuations in the intellectual activity during the Raven event, we suggested the calculation of deviations that may occur at the partial quotas obtained in the A, AB and B series by comparing them with the expected partial quotas according to the total score value (table number 3, Zaharnic et al., 1974).

Table 3. *Deviations that may occur at the partial odds obtained in the A, AB and B series*

Total score	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A	5	6	7	7	7	7	8	8	8	8	8	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12
AB	3	3	3	3	4	4	4	5	6	6	7	7	8	8	8	9	9	10	10	10	10	10	11	11	11	12	12
B	2	2	2	3	3	4	4	4	4	5	5	5	5	6	6	6	7	7	8	8	9	10	10	11	11	11	12

The training program (the applied intervention) complied with the somatic-physio-psychological characteristics of 6-year-olds. This program was divided into several stages, each with different training objectives (such as ball tackling, ball handling, dribbling, ball catching and passing, movement on the field etc.). As working materials we used the following: small-sized handballs, tennis balls, sticks, gymnastics benches, ladders, poles, straps, chairs, fences, gym mats. Each lesson used at least 3-4 exercises with a collective and playful character. Children had to pay attention to explanations to understand the rules of the games. In addition, the individual exercises for learning the basic technical elements such as dribbling and motor skill training require concentration, attention and increased effort on the part of children whose movements are rough and difficult to control. In the group of training exercises we included, during the training the following: individual exercises, application paths or circuits, pairs games, group games, all for learning technical elements, for training motor skills, for improving the capacity of attention and memorizing, and for training the ability to work in a group. In terms of frequency, the individual exercises took place in rounds of 2-3 minutes with 1 minute pause, but those in pairs without objects, being more intense, performed at 2-minute intervals, 2-3 repetitions each, with 1 minute pause between them. Group games were held in rounds of 5-7 minutes, 2 times each, with 1 minute pause between them.

Findings

Following the collection of the results, two tables (one for the initial evaluation and one for the final evaluation) have been compiled with the total of the centils obtained by each child, as well as the deviations of the each child placed in brackets, deviations that indicate the fluctuation of the attention and concentration during the event. By analyzing the results from the initial assessment (table number 4), following the testing and comparison of the results with those of the expected partial quotas according to the total result of the centils, the following specifications were obtained:

- the A series had a total plus of 5 points (centils), so 4 children had the result over the expected partial quota, 8 results are equal to the expected result, and 12 centils less than the expected result meaning that 8 children had a lower score than the expected one;
- the second AB series records 11 points over the expected result and 10 children with better results than expected, 6 children with the same number of points as expected, and 4 children with a number of centils below expected, registering together 5 points;
- the third series of images in group B records 9 centils below the expected partial quotas, so 8 children with worse results than expected, 7 children with results equal to those expected, and 5 children with results higher than expected (a total of 8 points in addition to the expected result);
- only 3 children had partial results equal to those expected, so they kept their attention and concentration constant throughout the test;
- 5 children had increasing results from the group A of images, where they had lower scores than the expected partial quotas, towards the groups AB and B where they had a plus or 0 score over the expected partial numbers, indicating a progress of the capacity of concentration and attention during the test;

- 5 children got worse results from one group of images to the other, starting from + results compared to the results of the expected partial quotas and reaching a total of -2 points compared to the expected result in the third group B of images, such as the first student, A.M.A. These five children have gradually lost their attention and concentration during the test;

- 7 children had fluctuating results throughout the test for the three groups of images, obtaining poorer results, for example in the first group of images than the expected results, then equal or even better than expected for the two group of images and again, worse results than expected for the last group.

These fluctuations prove the inability of children to keep their attention and concentration during the test. The average value of the total number of centils per student indicates a group with a level of intelligence above the average level. The total number of centils in the group was 435.

Table 4: *The results of the initial testing and the deviations recorded for the C.P.M. Test for the Al Nahda National Girls School, Abu Dhabi*

Crt. no.	Initials of Name and Surname	Results and deviations from expected results			
		A	AB	B	Total
1	A.M.A	10 (+2)	5 (-1)	3 (-1)	18
2	A.I	5 (-1)	4 (+1)	2 (0)	11
3	H.E.M.A	8 (-2)	9 (+1)	6 (0)	24
4	L.H.H	7 (-1)	5 (+1)	4 (0)	16
5	M.K.Y.A	8 (0)	5 (0)	4 (0)	17
6	T.G.M	8 (0)	7 (+1)	4 (-1)	19
7	J.J.M.S	5 (-3)	6 (+1)	6 (+2)	17
8	H.I.M.M.	7 (0)	3 (-1)	5 (+1)	15
9	M.A.D.S	10 (0)	9 (0)	6 (0)	25
10	I.M.B	11(+1)	10 (0)	7 (-1)	28
11	H.K	10 (0)	8 (-2)	10 (+2)	28
12	D.S.M.I	8 (-1)	9 (+1)	5 (0)	22
13	Y.M.A.S	8 (0)	8 (+1)	4 (-1)	20
14	S.G.M	9 (-1)	9 (-1)	10 (+2)	28
15	F.M.A.M	8 (-2)	9 (+1)	7 (+1)	24
16	H.S.R.	9 (+1)	6 (0)	4 (-1)	19
17	A.A.H.M	9 (-1)	12 (+2)	6 (-1)	27
18	D.H.A	11 (0)	11 (0)	7 (-1)	29
19	L.G.H	11 (+1)	9 (0)	6 (-1)	26
20	F.I.H.	9 (0)	8 (0)	5 (0)	22

The second test was applied on 16th April, six months after the first, and the results show an improvement in the children's capacity of attention stability and concentration.

In the second test (table number 5), following the analysis and comparison of the results with those of the expected partial quotas in relation to the total result of the centils, we found the following:

- the A series had a total plus of 4 points (centils), so 4 children had results over the expected partial quota, with a point less than at the initial test, 10 results equal to the expected result, therefore, 2 children in addition to the first testing achieved the expected result and 7 centils compared to the expected result, meaning 6 children scored less than the expected score, so with 2 children less than in the initial test;
- the second series of AB pictures recorded 8 points above the expected result, therefore 7 children, 3 less than at the initial testing, 10 children achieved the same results as expected, thus with 4 children more than at the first testing, and 3 children with a number of centils below the expected, with one child less than at the first testing, recording together 5 points;
- the third series of images from group B recorded 6 centils below the expected partial quotas, 3 centils less than at the first testing, and 2 children less, with only 6 children getting worse results than the expected ones.

Table 5: Results of the final testing and deviation recorded for applying the C.P.M. Test for the children of Al Nahda School National Girls School, Abu Dhabi

Crt. no.	Name and Surname Initials	Results and deviations from expected results			
		A	AB	B	Total
1.	A.M.A	8 (0)	6 (0)	5 (0)	19
2.	A.I	7 (0)	4 (+1)	2 (-1)	13
3.	H.E.M.A	10 (0)	8 (0)	6 (0)	24
4.	L.H.H	7 (-1)	5 (+1)	4 (0)	16
5.	M.K.Y.A	9 (0)	5 (0)	4 (0)	18
6.	T.G.M	8 (0)	7 (+1)	4 (-1)	19
7.	J.J.M.S	8 (0)	6 (0)	5 (0)	19
8.	H.I.M.M.	7 (0)	3 (-1)	5 (+1)	15
9.	M.A.D.S	10 (0)	9 (0)	6 (0)	25
10.	I.M.B	11 (+1)	10 (0)	7 (-1)	28
11.	H.K	11 (+1)	8 (-2)	9 (+1)	28
12.	D.S.M.I	8 (-1)	9 (+1)	5 (0)	22
13.	Y.M.A.S	8 (-1)	8 (+1)	5 (0)	21
14.	S.G.M	8 (-2)	10 (0)	10 (+2)	28
15.	F.M.A.M	9 (-1)	10 (+1)	7 (0)	26
16.	H.S.R.	9 (+1)	5 (-2)	6 (+1)	20
17.	A.A.H.M	9 (-1)	12 (+2)	6 (-1)	27
18.	D.H.A	11 (0)	10 (0)	7 (-1)	28
19.	L.G.H	11 (+1)	9 (0)	6 (-1)	26
20.	F.I.H.	9 (0)	8 (0)	5 (0)	22

Discussions and conclusions

Starting from the fact that the activities carried out are on the one hand a technical acquisition and on the other hand a change of attention and have an “active, discovery, interpretation and involvement role” (Cojocariu and Secară, 2005, p. 28), the comparative analysis of the results between the initial and the final evaluation revealed that:

- 10 children had the same results as expected, thus with 3 more children than the initial testing, and 4 children had better results than expected with one child less than the initial test;
- 6 children had equal results of the partial quotas to those of the expected partial quotas, with 3 more children than in the initial testing, demonstrating that constant physical exercises performed in an organized setting helped to increase the capacity of attention stability and concentration;
- 5 children, as at the initial testing, had an increase in the group A of image, where they showed results below those of the expected partial quotas, towards the groups AB and B where they had a plus or 0 score compared to the expected partial groups, indicating a progress in concentration and attention during the test;
- 2 children got even worse results from one group of images to the other, starting from + results with the results of the partial quotas expected in the group A of images and getting lower results with only one point this time, compared to the expected result in the third group B of images. Therefore, only two children lost their attention and concentration during the final test instead of 5 as at the initial testing, therefore practising physical exercise for 3 times a week positively influenced the children's attention and concentration;
- 4 children had fluctuating results throughout the test for the three groups of images, obtaining lower results, for example, in the first group of images, than the expected results, then results equal to or better than expected for the second group of images and again results worse than expected for the last group. These fluctuations prove their inability to keep their attention and concentration during the test. However, the number of children with attention and concentration fluctuations is reduced by 3 from the initial testing;
- one child achieved the lower test result by one centigrade than at the initial testing - student D.H.A. (18), and another 7 got better results by 1-2 centils than at the initial test, thus proving that keeping the attention and concentrating during a task leads to better results.

The number of centils in the group is with 8 point higher at the final testing (443) than at the initial testing, where 435 centils were obtained.

Taking into account that Schwartz, since 1976, believed that it was essential not to “learn how to know, but to learn how to act”, which emphasizes the need to improve the level of attention and concentration, we draw the following conclusions:

- the results obtained after the second test prove the efficiency of the physical exercise performed in an organized manner on the children's intellect;
- practising a sport at a young age influences not only the somatic-physical development of children or increase the socialization capacity, but also improves the capacity of attention concentration, psychic functions necessary in the learning process.
- it is thus confirmed the hypothesis according to which physical exercises that are constantly practiced in an organized setting contributes to the improvement of attention concentration capacity.

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THE INFLUENCE OF PILATES EXERCISES ON SOME PARAMETERS OF BREATHING

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Abstract. *Researched subject: In this paper we started from the assumption that conscious and controlled breathing techniques learned in Pilates workouts may substantially increase the quality and efficiency of breathing, and so it may increase the effects of the cardio-vascular training in the Aerobic classes. Participants: The study was conducted over a period of 12 months, on 40 adult female, practitioners of Health and Leisure Sports Programs at the Gym of "Carol Davila" University of Medicine and Pharmacy Bucharest. Method: The sample was divided into two groups of 20 subjects. The Control Group performed a program of Aerobic exercises three times per week. The Experiment Group followed a combined program with two Aerobics and one Pilates class per week. Initial and Final Tests were conducted on Anthropometric and Functional parameters. Anthropometric parameters measured were: Thoracic Perimeter in relaxation, in full inspiration and full expiration, and Thoracic Elasticity, resulting from the difference of the last two. Functional efficiency of breathing was assessed by determining Vital Capacity. Conclusions: After research, statistically significant differences resulted between the two groups, at all the investigated parameters, in favor of the Experiment Group. This validates the research hypothesis. In conclusion it confirms that, by learning Pilates breathing techniques (proper, conscious and controlled breathing) one can increase the effectiveness of aerobic training for optimizing the breathing act.*

Keywords: Pilates, aerobics, breathing.

Introduction

Breathing is a natural act. It comes as a reflex, and is the first thing a living being does after its birth, in order to stay alive. Being a reflex, most of the time we are not aware of our breathing, and not many people think they might improve it and get more benefits from a conscious and controlled breath, compared to a reflex one.

Ancient Indians and Chinese were among the first that considered the importance of conscious, proper breathing for both mental and physical areas of the human being. They were the ones who linked the quality of Breathing with the proper function of the Body's Organs and Systems, and with the mental well-being. Their observations were materialized in Systems like Yoga or Qi-gong, which represent, according to the Asian approach, a sort of Philosophy, combining Physical Exercises, Breathing, Spirituality and Life Principles.

In the 20th Century, America and Europe imported those Asian Disciplines, especially Yoga, and adapted them to the Western way of life, focusing mainly on their utility as Physical Exercises Systems. The main issues that distinguish those Exercise Systems from the European ones were: emphasizing the mental control over the body's motion and focusing on a conscious, active breathing while performing the motions.

However, Europe also produced its own original Exercise System that has those issues among its goals: the Pilates Concept. Developed by Joseph H. Pilates in 1920 and named „The Art of Contrology”, Pilates Concept focuses on achieving two main goals: toning the deep core stabilizer muscles and enhancing the mind control over the movements of the body and its segments (Ungaro, 2002). Both learning the movements and their subsequent implementation requires active participation and conscious mental control throughout the training process. To support this main idea, the Pilates method is based on a set of Leading Rules (Rodriguez, 2007, pp. 23-24; 28-31) that include: Conscious participation, Balance, Breath, Concentration, Activating the Body's stabilization Core, Control, Fluidity, Efficiency, Accuracy. Considering breath as Leading Rule, Pilates Concept aims to enhance the benefits of correct breathing upon: blood oxygenation and cellular nutrition, eliminating toxins, improving circulation, improving skin appearance, better relaxation, better concentration, supporting the muscular activity, increasing the regularity of the movements (Siler, 2000).

Pilates Workouts always start with learning the specific breathing technique that will then accompany the practice (Rodriguez, 2007). This breathing technique may be successfully transferred in other Physical exercises Programs, like Aerobics, and in every day activities.

Materials and methods

Premises

It is generally accepted that cardio-vascular training, such as aerobics, spinning or long distance running, are the best way to improve the breathing function (Macovei and Vişan, 2003, p. 31). Nevertheless, we consider that,

by learning and applying Pilates breathing techniques, one can bring a serious plus to the efficiency of aerobic training. So we started this work from the idea that conscious and controlled breathing techniques, learned in Pilates workouts, may substantially increase the quality and efficiency of breathing.

Purpose

The study aimed to investigate the effects of the Pilates breathing techniques upon some anthropometric and functional indices related to breath.

Hypothesis

We assumed that, by learning and applying Pilates breathing techniques, one may improve some anthropometrical and functional aspects related to breathing.

We also assumed that Pilates workouts may increase the efficiency of aerobic training in improving the breathing function.

Participants and Procedure

The study was conducted over a period of 12 months. The subjects of the research were 40 adult female, practitioners of Health and Leisure Sports Programs at the Gym of "Carol Davila" University of Medicine and Pharmacy Bucharest.

The sample was randomly divided into two groups of 20 participants. The Control Group performed a program of Aerobic exercises three times per week. The Experiment Group followed a combined program with two Aerobics and one Pilates Class per week.

Initial and Final Tests were conducted on Anthropometric and Functional parameters. Anthropometric parameters measured were: *Thoracic Perimeter in relaxation, in full inspiration and full expiration*, using a meter band. *Thoracic Elasticity* was calculated, resulting from the difference of the last two.

Vital Capacity, a relevant indicator for the functional efficiency of breathing (Cordun, 2009, p. 145) was measured with the help of a Spirometer.

Results

For each analyzed parameter we considered the Null Hypothesis (H_0) which states that there are no statistically significant differences between the average results of the two groups - Experimental and Control (we mention that this paper is part of a larger research). The rejection or the acceptance of the Null Hypothesis, made using single factor Anova Test, involves the confirmation or rejection of the Research Hypotheses.

Evolution of the registered parameters for each group

The results registered for the two groups were first analyzed *within* each group, in order to see the evolution of the considered parameters from the Initial to the Final Tests (table 1 and table 2).

Table 1. Comparing Control Group Initial and Final Tests

No.	Parameter	Test	Average	Difference F-I	Standard Deviation	Variability Coefficient	F	p	Null Hypothesis
1	Thoracic Perimeter	I	86.90	0.20	3.40	3.91%	1.45	> 0.05	Accepted
		F	87.10		3.61	4.15%			
2	Inhaling Thoracic Perimeter	I	89.50	1.70	3.63	4.06%	3.02	< 0.05	Rejected
		F	91.20		4.37	4.79%			
3	Exhaling Thoracic Perimeter	I	84.45	0.00	3.38	4.00%	0.00	> 0.05	Accepted
		F	84.45		3.58	4.23%			
4	Thoracic Elasticity	I	5.05	1.20	0.69	13.59%	13.08	< 0.05	Rejected
		F	6.25		0.79	12.58%			
5	Vital Capacity	I	3545.00	454.95	577.18	16.28%	30.54	< 0.05	Rejected
		F	3999.95		551.09	13.78%			

This analysis showed a statistically significant progress registered by both groups for the following parameters: *Inhaling Thoracic Perimeter*, *Thoracic Elasticity* and *Vital Capacity*. No significant evolution were noticed for the Thoracic Perimeters in relaxation and in exhalation. Considering these findings, only the parameters that showed a statistically significant evolution from the initial to the final Tests were included in the comparative analysis between groups at the final tests.

Table 2 . Comparing Experiment Group Initial and Final Tests

No.	Parameter	Test	Average	Difference F-I	Standard Deviation	Variability Coefficient	F	P	Null Hypothesis
1	Thoracic Perimeter	I	89.85	0.00	3.54	3.94%	1.00	> 0.05	Accepted
		F	89.85		3.54	3.94%			
2	Inhaling Thoracic Perimeter	I	92.60	1.95	3.41	3.68%	14.42	< 0.05	Rejected
		F	94.55		3.10	3.28%			
3	Exhaling Thoracic Perimeter	I	86.95	0.00	3.49	4.01%	1.00	> 0.05	Accepted
		F	86.95		3.49	4.01%			
4	Thoracic Elasticity	I	5.55	2.05	1.00	17.99%	13.36	< 0.05	Rejected
		F	7.60		1.39	18.31%			
5	Vital Capacity	I	3777.95	544.55	473.01	12.52%	21.47	< 0.05	Rejected
		F	4322.50		419.11	9.70%			

Comparative Analysis of results of the two groups at the Final Tests

Measurements of *Thoracic Perimeter in inhalation* at the final testing (table 3) showed an average of 91.20 cm for the Control Group, respectively 94.55 cm for the Experiment Group. We note that the average of the Experimental Group is 3.35 cm higher. The dispersion has a homogeneous structure data for both groups. Cohen's Index shows that the difference between the two averages is high to very high. Verification of statistical hypothesis performed with single factor ANOVA test shows a statistically significant difference between the averages, $p < 0.05$. We reject the Null Hypothesis and *accept the Research Hypothesis*.

Table 3. *Thoracic Perimeter in inhalation*

Statistic indicators	Results		ANOVA TEST	
	Control	Experiment		
Average	91.20	94.55	Significance threshold - α	$\alpha = 0,05$
Median	90.50	95.00	Null Hypothesis H_0	$m_1 - m_2 = 0$
Standard Deviation	4.37	3.10	Alternative Hypothesis H_1	$m_1 - m_2 \neq 0$
Maximum	100.00	99.00	F Critic	4.098
Minimum	84.00	89.00	Freedom degrees between groups - df_1	1
Amplitude	16.00	10.00	Freedom degrees between groups - df_2	38
Variation Coefficient	4.8%	3.3%	Subjects	40
Average Difference		3.35	TEST RESULTS	Calculated F
Cohen Index		0.45		7.808
				p
				< 0.05

Graphical representation (Fig. 1) supports these allegations.

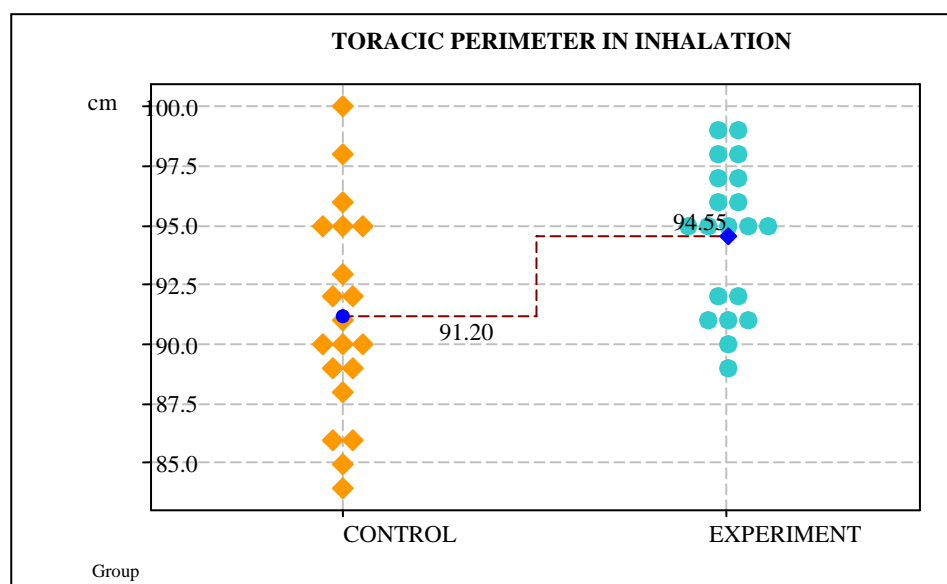


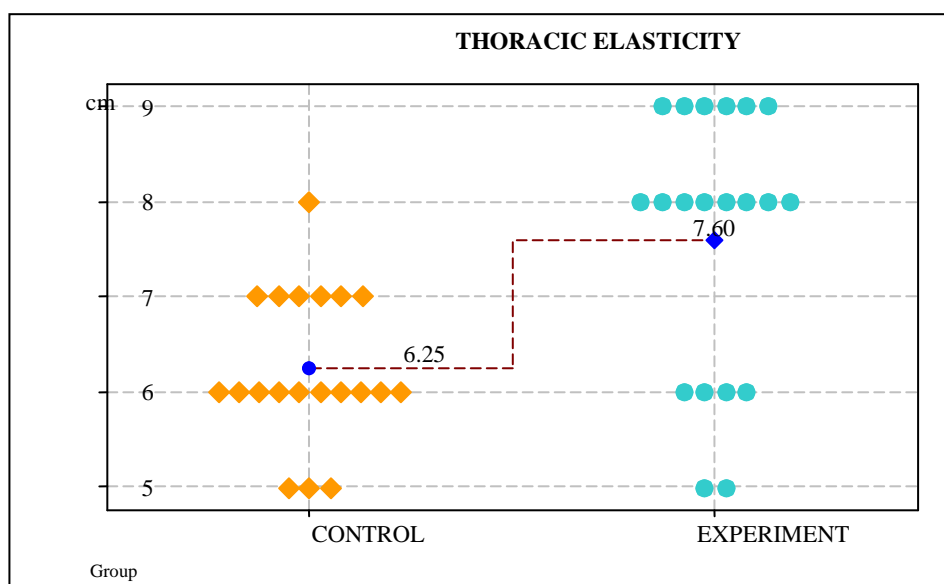
Fig.1. Thoracic Perimeter in inhalation

For *Thoracic Elasticity* the average for the two groups in final testing was 6.25 cm for the Control Group and 7.60 cm for the Experiment Group (table 4). The average of the Experiment Group is 1.35 cm higher. Control Group and Experimental Group are relatively homogeneous. Cohen's Index shows that the difference between the two averages is high to very high. Verification of the statistical hypothesis performed with single factor ANOVA Test shows that statistical significance threshold was reached, $p < 0.05$. We reject the Null Hypothesis and *accept the Research Hypothesis*.

Table 4. *Thoracic Elasticity*

Statistic indicators	Results		ANOVA TEST	
	Control	Experiment		
Average	6.25	7.60	Significance threshold - α	$\alpha = 0,05$
Median	6.00	8.00	Null Hypothesis H_0	$m_1 - m_2 = 0$
Standard Deviation	0.79	1.39	Alternative Hypothesis H_1	$m_1 - m_2 \neq 0$
Maximum	8.00	9.00	F Critic	4.098
Minimum	5.00	5.00	Freedom degrees between groups - df_1	1
Amplitude	3.00	4.00	Freedom degrees between groups - df_2	38
Variation Coefficient	12.6%	18.3%	Subjects	40 (20+20)
Average Difference		1.35	TEST RESULTS	Calculated F p
Cohen Index		0.61		14.265 < 0.05

Graphical representation (Fig. 2) illustrates these statements.



The averages obtained at the final testing for *Vital Capacity* were 3999.95 cm³ for the Control Group and 4322.50 cm³ for the Experiment Group (table 5). The average of the Experiment Group is 322.55 cm³ higher. The data dispersion for both groups shows a homogeneous structure. Cohen's Index shows that the difference between the two averages is medium to high. Verification of statistical hypothesis performed with single factor ANOVA Test shows a statistically significant difference between the averages, $p < 0.05$. We reject the Null Hypothesis and *accept the Research Hypothesis*.

Statistic indicators	Results		ANOVA TEST		
	Control	Experiment			
Average	3999.95	4322.50	Significance threshold - α		$\alpha = 0,05$
Median	4050.00	4300.00	Null Hypothesis H_0		$m_1 - m_2 = 0$
Standard Deviation	551.09	419.11	Alternative Hypothesis H_1		$m_1 - m_2 \neq 0$
Maximum	4700.00	5000.00	F Critic		4.098
Minimum	3150.00	3650.00	Freedom degrees between groups - df_1		1
Amplitude	1550.00	1350.00	Freedom degrees between groups - df_2		38
Variation Coefficient	13.8%	9.7%	Subjects		40 (20+20)
Average Difference		322.55	TEST RESULTS	Calculated F	p
Cohen Index		0.34		4.341	< 0.05

Graphical representation is showed in Fig. 3.

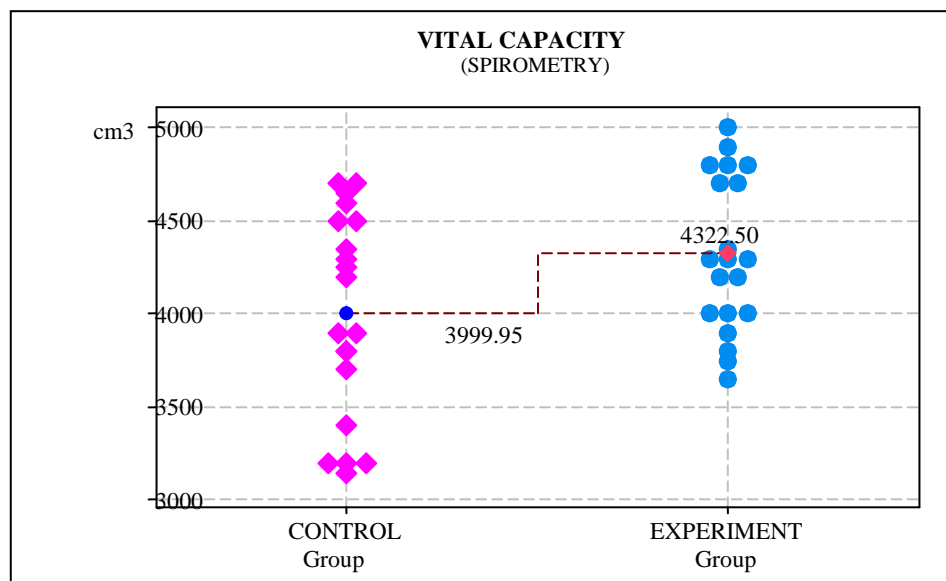


Fig. 3. Vital Capacity

Discussions and conclusions

The findings of the research can be summarized as follows:

- Both Control and Experiment Group registered statistically significant progress from the Initial to the Final Tests for the following parameters: *Inhaling Thoracic Perimeter*, *Thoracic Elasticity* and *Vital Capacity*.
- No significant evolution were noticed for the Thoracic Perimeters in relaxation and in exhalation.
- For the *Inhaling Thoracic Perimeter*, the difference between the averages registered by the two groups at the Initial and the Final Test was 1.70 cm for the Control Group, respectively 1.95 cm for The Experiment Group. This shows a plus of 0.25 cm in favor of the Experiment Group.
- For the *Thoracic Elasticity*, the difference between averages at the Initial and the Final Test was 1.20 cm for the Control Group, respectively 2.05 cm for The Experiment Group. This means that the Experiment Group progress was 0.85 cm bigger.
- For *Vital Capacity* we registered an average progress between the Initial and the Final Test of 454.95cm³ for the Control Group, respectively 544.55cm³ for The Experiment Group. The progress of the Experiment Group was bigger with 89.6 cm³.

From the findings, we can conclude the following:

- As a result of the training programs, both groups registered statistically significant progress at the *Inhaling Thoracic Perimeter*. This is some how expected, as a result of active breathing process during the workouts.
- The progress registered by the Inhaling Thoracic Perimeter lead to a proportional gain for the *Thoracic Elasticity*, wich is calculated as the difference of the Inhaling and Exhailing Perimeters.
- *Vital Capacity*, the functional parameter considered we considered relevant for the breathing act also showed a statistically significant improvement for both groups.
- The progress was considerably bigger in favor of the Experimental Group at all the considered parameters.

In conclusion the results of the experiment confirm that, by learning and applying Pilates breathing techniques (proper, conscious and controlled breathing), one may increase the efficiency of aerobic training, in terms of optimizing the breathing act.

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CHANGING PERSPECTIVES ON INTELLECTUAL DISABILITY THROUGH UNIFIED SPORTS MODEL

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Abstract. This study is part of the 2017-2018 EU Erasmus+ Project “Special Olympics: Leading the way to inclusion”, implemented by Special Olympics Europe Eurasia. Within the framework of the European Project carried out in five countries, this paper aims at delivering a relevant mirror-approach picture of the disabled children perceptions about their insertion in sport and school settings. Given the area of interest of this study, the social survey was the main research method we used. The questionnaire, included 42 items, divided in two sections, one for identifying social inclusion cues within Unified Sports teams and the second, leading to the same goal, but within school settings. Questionnaires were completed on a sports settings, by “face to face” interview. Operators were Special Olympics Romania staff and academics. 78 subjects, boys and girls, from 9 to 16 years old (37 Special Olympics athletes and 41 partners) participated in our social survey. The questionnaires were applied during the European Football week, in Resita (29-31 may 2017). In brief, research data collected from the Special Olympics athletes emphasized the following: keen interest in participation both in Unified Sports and school activities, with a slight ratio increase for the first; higher level of perception of the socialization cues in sport, compared to school activities; a more structured self-appraisal/self-esteem revealed in Unified sports, compared to school settings; girl subjects have in whole a lower level of perceiving social acceptance and appraisal of the peers in different settings. There is a growing evidence that social, interpersonal skills are widely enhanced through sport activities, especially when Unified sports concept is incorporated in competition system.

Keywords: Unified Sports, social inclusion, school settings, self-perception, social acceptance.

Introduction

This study is part of the EU Erasmus+ Project “Special Olympics: Leading the way to inclusion” 2017-2018, implemented by Special Olympics Europe Eurasia.

In the last decades remarkable progress has been made in diagnosing, prevention, rehabilitation, education, school, professional counseling and social integration of children with intellectual disabilities. Early intervention doubled by a decreasing power of stigma on society levels played a crucial role in offering opportunities for their social inclusion and empowerment.

Problem Statement

Authors like McConkey et al. (2014), Bota, Teodorescu and Șerbănoiu (2014), Scior (2011) summarize three important changes that differently shaped the policies concerning the disabled persons:

- the United Nations Convention on the Rights of Persons with Disabilities which states that a disability does not remove a person’s dignity and humanity;
- the second approach reveals mainstreaming as a way to improve the quality of life, also by reducing the number of special schools and thus segregation level.
- the World Health Organization (2011) vision changed in terms of no longer viewing disability as a medical condition, but as a *dynamic interaction* between biological factors and contextual factors – personal and environmental; in this context, it becomes important to remove barriers and create supports and adaptations to facilitate social inclusion.

Associated to enhancing the quality of life and social competence of the disabled persons, the inclusion-type approach promotes values with high echo on an individual and macro level - acceptance, group adherence, belonging, cohesion, removing barriers, empowerment, by reconfiguration of interpersonal skills and new attitudes towards self and the others. Reflective thinking in specialty literature emphasizes the role of social inclusion competences, as an ecosystemic issue, engaging different aspects (Sherrill, 2004):

- a) learning social behaviors that promote interaction and inclusion;
- b) developing beliefs and attitudes towards self and others which enhance social interactions;
- c) enhancing social inclusion and encouraging critical reflection about projecting and promoting different principles and models of inclusion, in different settings.

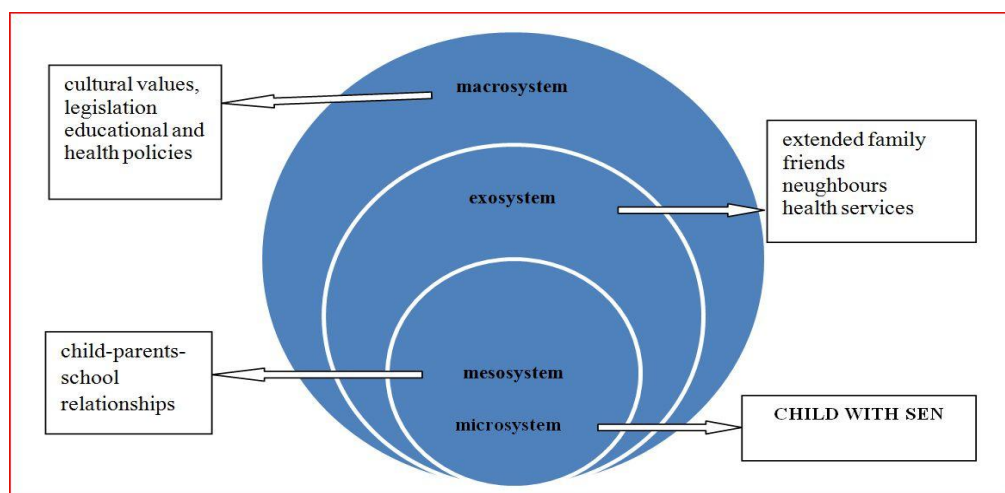


Fig. 1. Ecological model for inclusion (Bronfenbrenner, 1979 -modified)

Any inclusive environment encompasses physical space and adequate equipment designed to raise children active participation, in a safe, tension-free and emotionally secure climate, stressing mostly the cooperation, and not the rule of the strongest, fastest or most skilful one.

Internationally, all these approaches infuse Special Olympics programs – one of the best examples of good practice in the area of disabilities and social inclusion.

A study conducted by Gallup Organization in 2002 emphasized the perceptions of 800 persons, randomly selected in ten countries worldwide, regarding the views of people on intellectually disabled persons. Some of the items concerned the capability of ID people to play in sports teams along with non-disabled partners and possibility to attend mainstreams schools. At least two relevant aspects emerged from this research:

- important variations across countries (Germany with high percentages of positive perceptions and China and Japan with low perceptions about disabled persons, able to perform in a sports team);
- different opinions were also found when it came to attendance at regular or Special schools, this fact being explained by cultural and educational factors specific to different countries, related to how the label *intellectual disability* is understood worldwide (Siperstein et al., 2003, 2007).

Beart, Hardy and Buchan (2005), Todd and Shearn (1997) concentrated on how ID persons perceive themselves, their studies concluding that many disabled do not connect their self-identity to the presence of the disability, which is beneficial for their further involvement in communities.

The topics of school inclusion is also interesting in argumenting the journey from marginalization to mainstream education. Several studies applied on pupils (Slee, 2011) highlighted that improving school climate is essential to addressing social cohesion and personal empowerment for the future disabled adults. Positive social skills and pro-social behaviors have to be incorporated in curricula, especially in mainstreams schools, fact which leads to building a society wherein understanding one another, respect and support are seen as key-values.

Aims of the research

Within the framework of the European Project carried out in five countries, this paper aims at delivering a relevant mirror-approach picture of the disabled children perceptions about their insertion in sport and school settings.

Research Methods

Given the area of interest of this study, the social survey was the main research method we used (Babbie, 2009).

The questionnaire, drawn up by McConkey and Menke (2017) from Special Olympics Europe Eurasia, included 42 items, divided in two sections, one for identifying social inclusion cues within Unified Sports teams and the second, leading to the same goal, but within school settings. Along with these sections, the questionnaire included ten items for identifying personal data and aspects related to health, educational and employment status of the respondents. Questionnaires were completed on a sports settings, by “face to face” interview. Operators were Special Olympics Romania staff and academics.

All participants agreed to take part in the survey, expressing their genuine interest in being included in this study. The group including 78 subjects, boys and girls, from 9 to 16 years old (37 Special Olympics athletes and 41 partners) participated in our social survey (table number 3, Fig. 2).

Table 1. *Gender frequencies within the group*

		Frequency	Percent	Valid Percent
Valid	F	12	32.4	32.4
	M	25	67.6	67.6
	Total	37	100.0	100.0

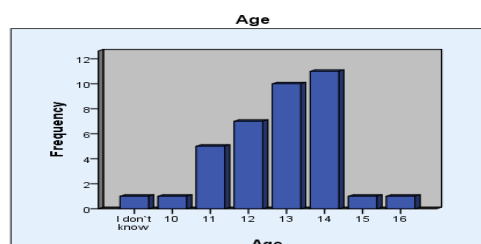


Fig. 2. Age frequencies within the group

The questionnaires were applied during the European Football week, in Resita (29-31 May 2017).

Findings

In the following we will review some of the most significant data related to the aim of this research. Table 2 reveals a comparison between the desire to attend school and Unified Sports activities for the subjects included in the present study. Frequency data emphasize that all subjects look forward to participating in Unified Sports, while six of them do not always want to attend school.

Table 2. *Looking forward to going to school / Looking forward to participating in Unified Sports*

		Frequency	Percent	Valid Percent
Valid	Yes	31 / 37	83.8 / 100	83.8 / 100
	Sometimes	4 / 0	10.8 / 0	10.8 / 0
	No	2 / 0	5.4 / 0	5.4 / 0
	Total	37 / 0	100.0 / 0	100.0 / 0

The perceptions about equal status in school and Unified Sports settings, delivered in table 3, reveal a mostly positive perception of the subjects (10 girls out of 12 and 19 boys out of 25), regarding their status in both situations compared.

Table 3. *Gender * All players are equal Crosstabulation / All pupils are equal in school Crosstabulation*

		All players are equal in Unified Sports/ All pupils are equal in school				Total
		Yes	Sometimes	No	I don't know	
Gender	F	10 / 10	0 / 0	2 / 1	0 / 1	12 / 12
	M	19 / 19	1 / 1	3 / 3	2 / 2	25 / 25
Total		29 / 29	1 / 1	5 / 4	2 / 3	37 / 37

Table 4 relates to the settings connected to finding one's best friends and possibility to hang out with peers within school and inclusive sports. Data show that school environment is perceived as less susceptible to generate best friends (24 subjects out of 37 subjects answer with *Sometimes* and *No* to the corresponding item; 26 subjects out of 37 subjects don't hang out with peers from school or do that on a irregular basis).

In contrast, 28 subjects out of 37 subjects found their best friends within Unified Sports team and also spend their free time in their company.

Table 4. *My best friends are in my school * I hang out with peers from school*

		I hang out with peers from school			Total
		Yes	Sometimes	No	
My best friends are in my school	Yes	9	12	12	33
	Sometimes	1	0	1	2
	No	1	1	0	2
Total		11	13	13	37
		I hang out with peers from Unified			Total
		Yes	Sometimes	No	
My best friends are from Unified	Yes	26	1	1	28
	Sometimes	1	1	0	2
	No	1	0	6	7
Total		28	2	7	37

Another interpersonal skill is embedded by the capacity to maintain contact with peers from sports and school settings, by means of phone and social media. Crosstabulation and gender analysis emphasize that boy subjects maintain social contact in a certain degree by phone and social media, but in a lesser extend compared to face to face interactions. Girl subjects obviously are less interested in extra-school and sport communication, fact illustrated in table 5.

Table 5. *Gender * I maintain contact with peers from Unified Sports /school, through phone and social media Crosstabulation*

		I maintain contact with peers from Unified Sports / school, through phone and social media				Total
		Yes	Sometimes	No	I don't know	
Gender	F	3 / 5	3 / 1	6 / 6	0 / 0	12
	M	10 / 3	8 / 13	6 / 9	1 / 0	25
Total		13 / 8	11 / 14	12 / 15	1 / 0	37

Self perception and self esteem are usually linked to the level of instructional and physical competences, all adapted physical activities strengthening cognitive, affective and motor abilities. Data underline that a positive self concept is more related to Unified Sports (32 out of 37 subjects), rather than related to school (25 out of 37 subjects). Concerning the construction of self esteem, it appears that sports activities are more likely to influence this treat (33 out of 37 subjects answered *Yes* to the corresponding item), compared to the role of school in this respect (25 out of 37 subjects answered *Yes* to the corresponding item).

Table 6. *Good opinion on myself when participating in Unified Sports / school * Perception of the role of Unified Sports in building self-esteem / School builds my self-esteem Crosstabulation*

					Perception of the role of Unified Sports in building self-esteem			
					Yes	Sometimes	No	Total
Good opinion on myself when participating in Unified Sports				Yes	33	1	1	35
				Sometimes	1	1	0	2
Total					34	2	1	37
					School builds my self-esteem			
					Yes	Someties	No	Total
Good opinion on myself when participating to school				Yes	25	1	1	27
				Sometimes	3	2	1	6
				No	3	0	0	3
				I don`t know	1	0	0	1
Total					32	3	2	37

Negative attitudes towards the subjects, as perceived by these are reflected in table 7, wherein 91.9% of the disabled athletes believe that they are not the object of a disrespectful behavior within Unified Sports. 86.5% of the same sample has the same perception, related to school settings.

Table 7. *Peers from Unified Sports act disrespectfully towards me / Peers from school act disrespectfully towards me*

		Frequency	Percent	Valid Percent
Valid	Yes	1 / 1	2.7 / 2.7	2.7 / 2.7
	Sometimes	2 / 4	5.4 / 10.8	5.4 / 10.8
	No	34 / 32	91.9 / 86.5	91.9 / 86.5
	Total	37 / 37	100.0 / 100.0	100.0 / 100.0

A sense of worthiness for the disabled athletes is depicted in table 8 which emphasizes small differences in their perception regarding the way their peers think about them: 10 girl subjects out of 12 and 20 boy subjects out of 25 consider that they are esteemed both in Unified Sports and school activities. 2 boy subjects out of 25 asserts that school peers do not think highly of them, fact that might influence their self esteem.

Table 8. *Gender * Peers from Unified Sports think highly of you / Peers from school believe that I manage in educational settings. Crosstabulation*

		Peers from Unified Sports think highly of you/ Peers from school believe that I manage in educational settings				Total
		Yes	Sometimes	I don't know	No	
Gender	F	10 / 10	0 / 0	0 / 2	0 / 0	12
	M	20 / 16	4 / 2	4 / 5	0 / 2	25
Total		30 / 26	4 / 2	3 / 7	0 / 2	37

Discussions

Enhancing affective domain is an important strand of any physical education and sports program. The very nature of a child or teenager relates to cooperative learning, positive interactions and certain behavioral features.

Similar studies (Farrel et al., 2004; Mahy et al., 2010) investigated the motivation to pursue physical activities in disabled athletes and revealed that the most frequent *likes* about Special Olympics Program were connected to “friends in program / making new friends” followed by the “quality of coaches / volunteers” and “family support”.

This study represents both a descriptive analysis of the Special Olympics athletes’ attitudes versus their integration in social environment and an evaluative approach of the way school and Unified Sports model activities succeed in reducing the social gap caused by disability.

Analysing data lead us to some relevant aspects which actually confirm research delivered worldwide on this topics (Bota, Teodorescu and Șerbănoiu, 2014; Hassan, Dowling and McConkey, 2014).

Basically the surveyed subjects perceive in a positive way their equality of chances to perform both in school and sport settings, fact which could be interpreted as a motivating factor, vital to encourage their participation in social life (tables 2 and 3). It is obvious that perceived competence in sports can secure the integration of the disabled athletes in educational system.

The sense of belonging to a certain group, as a component of a positive self-concept is mostly reinforced by the unified cohesive sport team as compared to school class (table 4), which appears to be less best friends generator.

Maintaining contact with school and sport mates outside regular formal activities was another cue addressed in the questionnaire which revealed that both boy and girl subjects are not particularly interested in using phone and social media, compared to face to face interactions (table 5).

The hierarchical view of self concept enhancement includes self esteem as an output of motor learning, fitness enhancement, increase of perceived competences and self confidence (Gallahue, 1993). This construct is better represented in Unified Sport compared to school settings, both situations being almost equally generating the good opinion on oneself for the subjects included in this study (table 6). Evidence shows once again that sports represent an important vehicle in changing attitudes and perceptions, removing social barriers and overcoming

roadblocks experienced on a regular basis by disabled people, some of these cues being revealed by our mirror - approach study.

A growing evidence highlights two aspects, which sharpen the need to encourage sports participation based on the inclusive model:

- intellectually disabled people experience a higher risk of social marginalization and exclusion, no matter their age and gender;
- practical experiences worldwide stress the idea that social inclusion doesn't occur spontaneously; it needs strong will of the leadership, permanent social partnerships among mainstream, inclusive and special schools, sports clubs, NGO's, sport federations and academic environment responsible for training the specialists and also fostering the volunteering spirit among their students and staff.

Conclusions

On a general view, investigated athletes with intellectual disabilities express confidently their opinions on social topics. This fact emphasizes the need of intervention, by educational professionals, to encourage them to express, regardless of their age, gender or type of school attended.

Bringing Unified sports and Unify Project into the schools is an excellent opportunity for preparing the children and young people to understand and embrace positive constructs like acceptance, adherence, sharing, friendship, caring and making a difference in somebody's life. Furthermore, these projects are an expression of the physical education and sport models, created to help subjects with special needs gain the social competence and other specific skills to function independently on a long term.

No matter what the instructional design or curriculum model, attitude change intervention to support inclusion must be embedded in every lesson plan and physical activity, so that school communities can act like advocates for the cause of the disabled people.

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THEORETICAL ASPECTS OF STRENGTH TRAINING PERIODIZATION IN RUGBY

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Abstract. *The Rugby has evolved more and more over time, thus, training requires a thoroughly monitored planning, on short, medium and long term. In rugby, the strength and conditioning coach is always communicating with the other coaches, as he is responsible for the physical training. Training has to be planned according to each player and the strength and conditioning coach has to be creative and possess the knowledge to create an effective periodization. Access to new technology and information provides a great variety of strength development means and methods, but those involved have to choose the optimal exercises for each player, in order for them to achieve their full potential. When coaches plan strength periodization, they always have to start from the principles and laws of strength periodization. By following the principles of strength periodization, we can avoid injuries, which happen very often in rugby. We consider that, in periodization, every coach should start from the theoretical aspects and continue with choosing the best methods. Specialized literature provides a lot more general aspects. Our paper is taking into consideration only those elements, determinant for strength periodization in rugby.*

Keywords: rugby, strength training, planning, periodization.

Introduction

As any other sport, rugby has a few fundamental components which define it: technical, tactical, physical, psychological and other component. Understanding the way in which these are combined leads to performance. Nowadays, most coaches closely follow the development of the physical component, because the technical-tactical one cannot be maintained at a higher level without a good conditioning. One of the main objectives of physical training is strength periodization, which is why we excerpted from published literature the most important aspects of how strength is approached in training.

The current level reflected in specialized literature

In Vladimir M. Zatsiorsky's view, Adaptation is the main law of training. The most important objective is "to induce specific adaptations in order to improve sport performance" (Zatsiorsky and Kraemer, 2006). From his practical point of view, he talks about the four characteristics of the adaptation: stimulus magnitude or overload, accommodation, specificity and individualization. Overload is the first feature applied in adaptation. Zatsiorsky talks about two ways: "One is to increase the training load (intensity, volume) while continuing to employ the same drill, for example, endurance running" and "The other is to change the drill, provided that the exercise is new and the athlete is not accustomed to it". He classified training loads according to their magnitude: *stimulating* (training load is above neutral level, can appear positive adaptation), *retaining* (training load is in the neutral zone, fitness level is maintained), *detraining* (training load is below neutral zone, decrease in functional capabilities and performance results). Accommodation is considered a general law of biology. The author describes this phase as "the response of a biological object to a constant stimulus decreases over time", therefore, in order to avoid the accommodation he suggests not to use standard exercises or the same training load over a long period of time. There are two ways to modify training programs: changing training loads (modify sets, repetition) or replacing the exercises (Zatsiorsky and Kraemer, 2006). Specificity is described "as an issue of transfer of training results". The author says "specificity of adaptation increases with the level of sport mastery". He also talks about transfer of training in beginners, where all exercises can help improve their performance. "Individualization of training will optimize results and enhance the desired adaptation to the training protocol". He thinks average athletes can prepare with average methods, but champions are not like average athletes, so they need to prepare with individualized methods.

In their book, Zatsiorsky and Kraemer talks about the Generalized Theories of Training. He describes the One-Factor Theory (i.e. the Theory of Supercompensation): "After the restoration period, the level of the given biochemical substance is believed to increase above the initial level. This is called supercompensation, and the time period when there is an enhanced level of the substance is the supercompensation." They talk about rest intervals, which if too short, the level of fitness decreases, and if perfect, the level of fitness will coincide in time with supercompensation. "In general, the theory of supercompensation is too simple to be correct" - Zatsiorsky

(2006). The Two-Factor Theory (or the Fitness-Fatigue Theory) is a more complex theory described by the author. “It is based on the idea that preparedness, characterized by the athlete’s potential sport performance, is not stable but rather varies with time.” According to this theory, one of the immediate training effects after a workout is gain in fitness, which is attained through workout and fatigue.

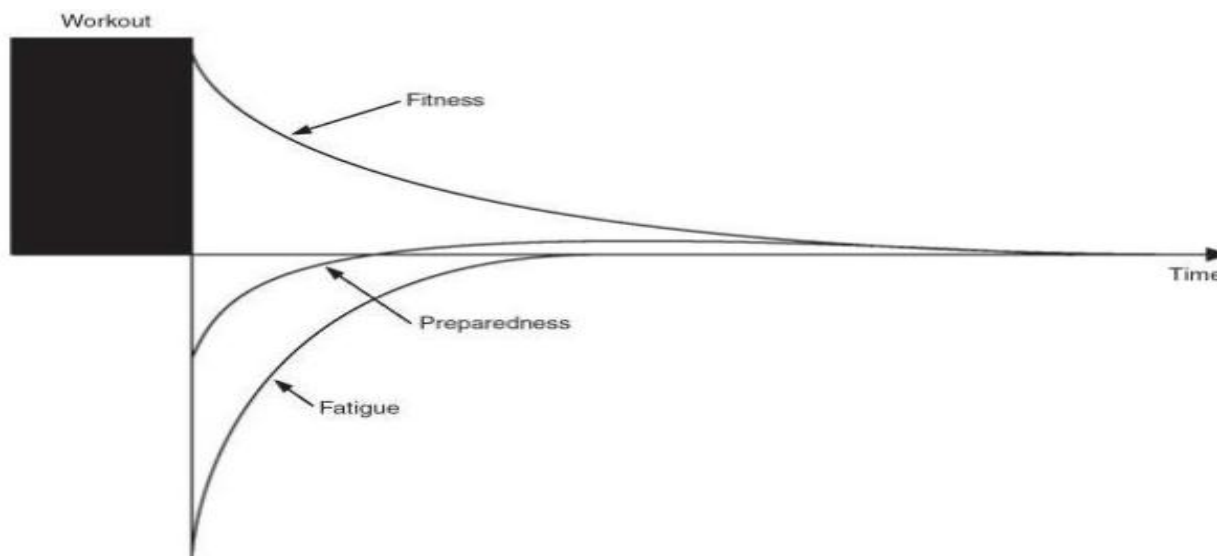


Fig. 1. Two-factor theory model of training

The „two-factor theory model“ states that „the immediate effect of a training session is characterized by the joint action of two processes: fitness gain and fatigue. Athlete preparedness improves because of fitness gain and worsens because of fatigue” (Riewald and Rodeo, 2015).

Bompa and Buzzichelli (2015) says “any strength training program should be started by applying the seven laws of training to ensure adaptation and to keep the athlete free of injury”. For the author, building a strong base is important, because in the later phases you can work more specifically with the athlete.

In *Periodization Training for Sports*, the authors presents the *Seven Laws of Strength Training*:

1. *Developing Joint Mobility*: Using the entire range of motion of a joint will prevent strain and pain around the articulation. If the mobility is developed in prepubescence and pubescence, in later phases athletes only need to maintain it.
2. *Developing Ligament and Tendon Strength*: Going through a cycle of loading and unloading will help the tendons and ligaments to prepare for higher loads in the future. Bompa says that not skipping the anatomical adaptation phase of training will allow to prepare for the next stages, staying injury free.
3. *Developing Core Strength*: “The arms and legs are only as strong as the trunk. Put another way, a poorly developed trunk provides only a weak support for hard-working limbs”.
4. *Developing the Stabilizers*: The stabilizer muscles help the prime muscles work more efficiently. Unilateral movements are perfect for developing the stabilizers (Gabbett, Jenkins and Abernethy, 2011).
5. *Training Movements, Not Individual Muscles*: Sports involve multijoint movements and not isolated ones. “During the conversion (to specific strength) phase, body position and limb angles should resemble those needed for the specific skills to be performed”. Isolated movements can be used as accessory exercises for supporting the hypertrophy phase or to support the muscle protein content of the prime movers in periods of low reps and high loads.
6. *Focusing Not on What Is New but on What Is Necessary*: In this law, the author talks about exercises’ selection, as new sport and fitness market brings miraculous methods of improvement.
7. *Periodizing Strength in the Long Term*: “Strength and conditioning coaches should plan the strength training progression in a way that maximizes the athlete’s motor potential over the long term”. General strength base should be provided over time by intermuscular coordination training. Specific strength can be increased with a good planned maximum strength phase, at multiyear level.

In Bompa's view, there are four principles of strength training, and all programs should be built based on these. The first principle is called *Progressive Increase of Load*. For this principle, it is suggested a *step-type loading*. This method requires an increase in training load followed by an unloading phase. In the unloading phase the body has time to adapt, regenerate and be prepared for a new loading phase. "The unloading microcycles is determined by each athlete's needs, the rate of adaptation, and the competitive calendar" (Bompa and Buzzichelli, 2015). In their book, they present two step-loading methods suitable for every sport:

- *Reverse step loading* - In this method the heaviest loads are planned directly after a low-intensity microcycle. The reverse step loading is recommended just during the peaking cycle preceding to competition.

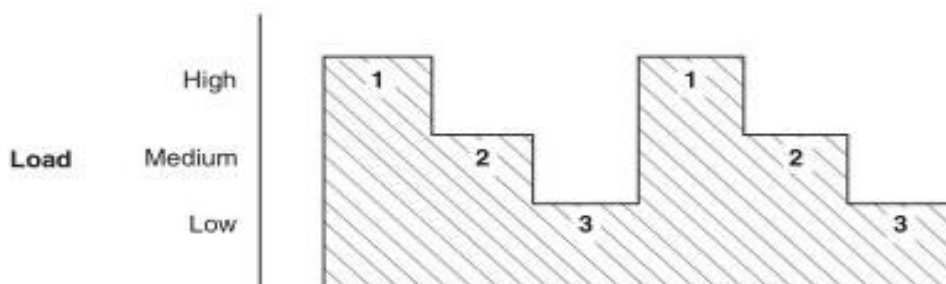


Fig. 2. Reverse step loading

- *Flat loading pattern* - The author recommends this method for athletes who don't accept high-intensity training. Here are used three consecutive high load microcycles followed by a low-intensity recovery week. In order not to accumulate too much fatigue, two microcycles will involve high demands from one or all elements: technical, tactical, speed and endurance. Flat loading pattern is recommended for the late preparatory phase.

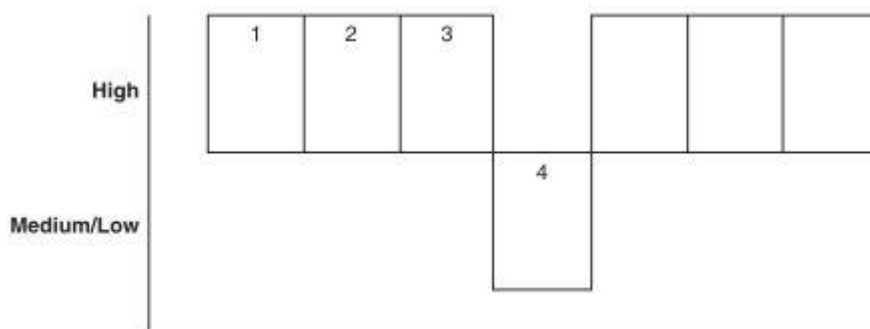


Fig. 3. Flat loading pattern

The second principle in Bompa's view is *Variety*. "Boredom and monotony can become obstacles to motivation and improvement. The best way to overcome these obstacles is to incorporate variety into training routines" (Bompa and Buzzichelli, 2015). Examples of varieties applied in training:

- Progressing from the general preparation phase to sport-specific preparation;
- Switching from bilateral exercises to unilateral exercises;
- Moving from body weight, dumbbells and machines during the anatomical adaptation and then moving to barbells in maximum strength, conversion to specific strength and maintenance;
- Varying loading using the principle of progressive loading.

The third principle is *Individualization*. "Contemporary training requires individualization. Each athlete must be treated according to his or her ability, potential, and strength training background". The authors suggest not to use training programs of successful athletes, because every athlete has different biological and psychological particularities.

The last principle presented is *Specificity*. It is considered that training should be oriented to develop sport-specific strength. To do so, strength and conditioning coach should take into account (Dragnea and Teodorescu, 2002):

- *Specificity and the Dominant Energy System*
- *Specificity Versus a Methodical Approach*
- *Specificity of Exercise for Strength Training*

Discussions

We recommend the strength periodization made by Bompa, who states that “any strength training program should be started by applying the seven laws of training to ensure adaptation and to keep the athlete free of injury”. For him, building a strong base is important, because in the later phases you can work more specifically with the athlete. In Zatsiorsky’s view, *Adaptation* is the main law of training. The most important objective is “to induce specific adaptations in order to improve sport performance”. We consider that, in periodization, every coach should start from the theoretical aspects and continue with choosing the best methods for those in question. Undoubtedly, published literature provides a lot more general aspects, but we are taking into consideration only those mentioned above, determinant for strength periodization in rugby.

Conclusions

When coaches plan strength periodization, they always have to start from the principles and laws of strength periodization. They have to plan the strength program in detail, starting from the macrostructure objectives and getting to the microstructure objectives. It is definitely necessary to start with adapting the athlete, anatomically, to effort and then to increase his strength and power. By following the principles of strength periodization, we can avoid injuries, which happen very often in rugby.

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NEWS IN KINETIC TREATMENT OF HIP DYSPLASIA

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Abstract. *This paper aims to show the results of physical therapy on patients with hip dysplasia. If treatment is initiated earlier has much better results, helping to improve the quality of life and the formation of cortical engrams as close to the age of development, lowers the cost of interventions and decreases physical and psychological sequelae. The specific objective of the study is to identify and assess stiffness of joints in children with hip dysplasia and help them through kinetic program conducted under the guidance of physiotherapist, developing a therapeutic program able to increase the amplitude of the joint and increase muscle strength, achieving valid data to demonstrate the effects of physical therapy and rehabilitation in the development of walking and thus facilitating the social reintegration of the child. To show the importance of physical therapy in recovery of gait in children with hip dysplasia we have hypothesized: early detection of hip dysplasia, coupled with the rapid implementation of a kinetic treatment which followed an original appropriate methodology, leads to a very good stability of hip in the case of childrens. The research methods used in this study are: observation method, bibliographical study, cvasiexperimental method, graphic method, method of statistical and mathematical data processing and graphical representation of results. Final results obtained are different to the original and allow us to conclude that early institution of analytical and global kinetic treatment, customized for each patient, results in improvement biomechanical parameters of hip improvement.*

Keywords: *hip dysplasia development, increase muscle strength, treatment goals.*

Introduction

Hip dysplasia is a group of developmental disorders, presented in different forms at different ages. Common etiology is excessive laxity of the hip capsule with failure to maintain the femoral head within the acetabulum. In healthy persons this cavity is a deep cup, while in people with hip dysplasia of the hip the capsule is rather flat or appears as a shallow indentation, which allows the femur to slide partially or wholly outside the acetabulum. In some EU countries (Austria, Switzerland, Germany, Czech Republic, Great Britain, France, Italy, Poland), hip ultrasound is mandatory for newborn (Herring, 2013). Thus, it was found a drastically decrease in the cases of congenital hip dislocation, while the cases timely undiagnosed require surgical treatment.

Evaluation means used in congenital dislocation of the hip were:

- Ultrasound hip;
- Radiographs of the hip;
- Assessing muscle strength according to Lovett and Martin;
- Artokinetic evaluation (assessment and evaluation Angle mobility motor sector).

The purpose of this paper was to identify foreseeable factors that could indicate a possible future best dysplasia and to reveal effective rehabilitation treatment in preventing congenital hip dislocation and also, in the recovering patient.

The objectives of our research were: identifying and assessing stiffness of joints in children with hip dysplasia and fight that condition, through kinetic program, conducted under the guidance of physiotherapist, developing a therapeutic program able to increase the amplitude of the joint and increase muscular strength; obtaining data in order to demonstrate the effects of physical therapy and rehabilitation in the development of walking and also, influencing the social reintegration of the child (Cordun, 1999).

The objectives of treatment were: increase joint amplitude, decrease joint stiffness, develop muscle strength and restore balance between agonists and antagonists.

Hypothesis: early detection of hip dysplasia accompanied by rapid implementation of appropriate kinetic treatment after the original methodology, may lead to a very good determination of the child.

Materials and Methods

Research methods used in this study were: observation method, bibliographical study, experimental method, graphic method, method of statistical and mathematical data processing and graphical representation of results (Niculescu, 2002). For the selection of a group of subjects was performed Arto-myo-kinetic evaluation of patients to qualitatively and quantitatively assess their ability to move. We selected patients presenting with similar clinical features, associated disorders and closer age to constitute a homogeneous group (Cordun, 2009).

We divided the group into five groups according to treatment:

- *Group I* - includes patients aged between 2 and 6 months who have received treatment kinetic and posture;
- *Group II* - includes patients who have received treatment and recovery orthotic;
- *Group III* - consisted of patients extracted by orthopedic, physiotherapy and electrotherapy;
- *Group IV* - comprising patients undergoing surgical light (adductor tenotomy muscles, re-bleeding) and treated by orthopedic and physiotherapy methods (with the specific and non-specific);
- *Group V* - includes patients who have received complex surgical treatment (Collona capsular arthroplasty, direction and support osteotomy) and received orthopedic treatment, physiotherapy and electrotherapy.

Rehab hip dysplasia treatment is aiming to fulfill the following objectives:

- Ensure good stability of the hip;
- Ensure functional mobility angles and avoid joint stiffness;
- Pain relief;
- Increased muscle strength, increase coordination and improve blood circulation.

We present below punctual treatment of the five groups of subjects:

Group I - patients aged between 2 and 6 months, treatment consisted of: positioning his hips in abduction (Mostert, Tulp and Castelein, 2000). We used Freika pillow, pantyhose abduction, folded diaper or two diapers. The patient has maintained this position as much as possible throughout the day (Albu, Armbruster and Albu, 2012).

The exercises used in the recovery program were:

- Passive mobilization of the affected limb;
- Curls;
- Extensions;
- Abduction;
- External rotation;
- Slight traction in the shaft;
- Posture correct positions;
- Massage for muscle toning hip stabilizers.

On a meeting were executed movements 15-20/ series, two series with 2 minutes break. In the first month frequency of meetings was 4-5 times/ week, during of a meeting was approximately 30-40 minutes. Thereafter, the frequency decreased to 2-3 week sessions, lasting about 30 minutes.

Group II - patients aged between 10 months and one year we used in treatment, in addition to other methods and Pavlik harness (Fig. 4). It makes reducing dislocated hip joint manipulation through a flexion and abduction daily (Churgay and Caruthers, 1992).

The exercises used in the recovery program were:

- passive mobilization of the affected limb;
- curls;
- extensions;
- abduction;
- external rotation;
- slight traction in the shaft;
- posture correct positions using weights;
- massage hip stabilizer muscle toning;

In a meeting of recovery were executed movements 15-20/ series, two series with 2 minutes break. In the first month frequency of meetings is 4-5 times/ week, duration of a meeting being approximately 30-40 minutes. Thereafter, the frequency decreased to 2-3 week sessions lasting about 30 minutes.

Group III - is treated by methods orthopedic, physiotherapy and electrotherapy. This group passed all 62 patients (including those in these two groups), but the 15 in the group are responders orthopedic treatment, the other 47 have progressed to surgery.

The treatment in this group of patients was applied in two stages:

- Phase I - in between casts will perform massage, passive motion, active and active-passive assisted. I insisted on mobilizing the knee extensors and flexors tone.

- Phase II - during restraint, which can take from 3-8 weeks, we conducted a general kinesiology healthy limb. To avoid the vicious attitudes (flexum, adduction and internal rotation) will perform posture and buttocks and quadriceps muscles will curing, isometric exercises (Motet, 2011).

The exercises used in the recovery program of this group were:

- antideclive posture;
- relaxation massage (activating circulation, trophic, local inflammatory);
- exercises of the upper limb, torso and lower limb healthy;
- flexion-extension of both legs;
- abduction of lower members;
- circles;
- passive mobilization of the foot, knee, hip;
- passive motion with the knee flexed;
- patient supine knee flexed, executed passive flexion hip-femoral joint to limit the pain;
- patient prone, knee flexed, executive hip-femoral joint passive extension, setting worktable basin plan;
- patient supine passive execute movements of abduction / adduction, setting basin;
- patient supine with the leg extended rotations execute external / internal running the thigh with both hands;
- passive stretching of the muscles and ligaments through posture contracture;
- to reduce hip-femoral joint flexum the patient will stay in the prone position, with a small pillow under the belly and one below the knee, and the pool can apply weight gradually increases muscle stretching for 10-15 minutes/ session ;
- patient supine with legs skettinguri, running knee and hip flexion, slipping on a plate talc;
- patient lying basin plan fixed to the bed, running hip flexion with and without knee flexion;
- supine trunk flexion runs on the thigh, followed by knee flexion;
- toning abdominal muscles in supine position with knees bent: flexion of the trunk runs up to 45 degrees, with upper limb above the knee in extension;
- prone, with pool on the outskirts of fixed table: leave flexed thigh to fall; flexion may be increased;
- extensions running great for toning legs and buttock muscles Paravertebral;
- prone, knee flexed to 90 degrees runs hip extension of the plan;
- supine, knees bent - patient pushes up the basin;
- patient supine with skettinguri ankle running talc adduction on a plate;
- patient lying rises on plane left leg and knee bed extended-adduction runs abduction hip-femoral articulation;
- amounts leg extended on the bed and runs adduction plan;
- supine with the knee flexed, in adduction;
- suspended from the trellis are adduction with both legs and then secure the right leg and runs adduction with left leg;
- from standing - side lunge runs;
- supine crosses the lower limbs;
- supine with both legs interlocked runs lateral movements;
- supine, legs extended: rotates the leg outside - in;
- patient sitting on the bed, fixed thigh, hip external rotation is performed by bringing in leg over the other leg: it resists the domestic front ankle and resistance against the external face of the knee;
- sitting cross-legged on the floor knees pressed;
- upright - tiptoes and heels approaching departs;
- toning isometric quadriceps exercises for: strong quadriceps contraction in supine viewing kneecap movements;
- patient sitting on the bed, bent knee, ankle drop pods sand, running knee extensions to muscle fatigue;
- the same exercise but with pulley;
- squats on trellis with feet together, feet on the ground;
- facing the trellis, patient lifts his foot on the second step lead foot on the ground;
- facing the trellis, running adduction - abduction of the lower limb;

- upright, support healthy leg with the affected leg with the knee extended and goes running just before isometric contraction of the quadriceps.

Exercises to increase muscle strength is associated with medium frequency electric stimulation. Muscles targeted were quadriceps and buttocks. The intensity was progressive and had a 30 minute meeting.

Per meeting were executed movements 20-30/ series, two series with 2 minutes break. In the first month frequency of meetings was 4-5 times/ week, durratation of a meeting being approximately 30-40 minutes. Thereafter, the frequency decreased to 2-3 week sessions lasting about 30 minutes.

Group IV and V - patients who underwent surgery and received orthopedic treatment, physiotherapy and electrotherapy. In group IV are patients with simple interventions (adductor tenotomy muscles, re-bleeding) while in Group V are patients with more complex interventions (collon capsular artoplastic, direction and support osteotomy). In these patients have the same two treatment stages: pre-operatively and post-operatively.

Pre-op program had the following objectives:

- Increase muscle strength (gluteal, quadriceps) leg to be operated;
- Increase awareness and coordination contralateral limb;
- Upper limb muscle force;
- Improving breathing (abdominal breathing learning);
- Improving venous circultiei member will be operated.

At this stage, the recovery program consisting of passive mobilization of the knee, leg, hip, knee flexed passive mobilization, mobilization and active-assisted passive-active.

Post-operative program aims to:

- Pain relief;
- Ensuring stability and hip mobility;
- Increased muscle strength;

The recovery program is made up of the same exercises of group 3, at the same frequency and duration. At the end of the week, the last meeting, we've applied kinesiology tapes. Every day, keloid scarring, we performed massage and laser therapy to avoid joining tendon to scar (the effect is to limit joint amplitudes). Exercises are loaded progressively, depending on age, muscle tone and level of cooperation.

Frequency:

- daily for 2 weeks after restraint;
- 3 sessions / week for 3 months (until loaded hinge)
- 2 sessions / week for 2 months.

Duration: 30 - 40 minutes

To increase muscle strength and electro partnered cases that have allowed this. I used medium frequency currents (Kiss, 2007). Muscles targeted were quadriceps and buttocks. The intensity was progressive and had a 30 minute meeting. For congenital dislocation of the hip in recovery are contraindicated internal rotation and adduction movements. Results: In the balance intergroup all 5 groups, the movements studied after recovery from treatment there is a better evolution in the first 2 groups together with the results in the table below. 1 on the average duration of treatment.

Table 1. *Comparative evolution of motion for flexion intergroup*

		Group I	Group II	Group III	Group IV	Group V
Initial values	medium	30.25	30	31.5	31.5	31.5
Final values	medium	74.5	85.2	82.8	82.5	81.1

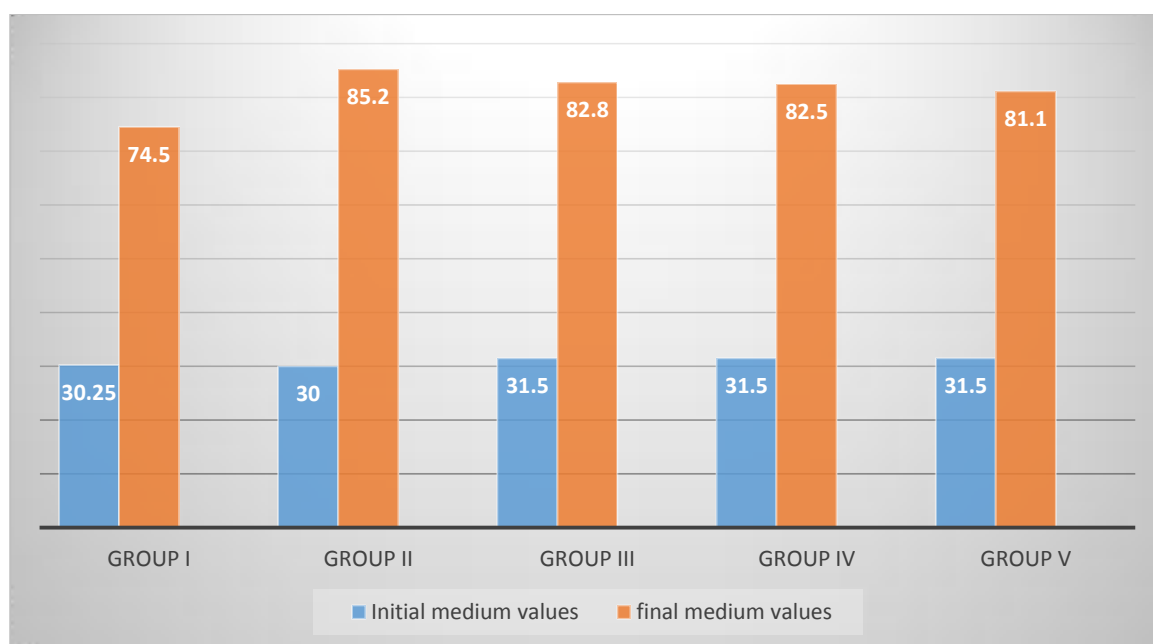


Fig. 1. Comparative evolution of motion for flexion intergroup

For flexion, the intergroup measurements are observed in Fig. 1 (initial and final values in the case of the five groups).

Table 2. The average duration of treatment (days)

	Recovery	Orthopedic	Surgical	Total
Group I	60	-	-	60
Group II	90	-	-	90
Group III	240	42	-	282
Group IV	>365	56	14	>435
Group V	>365	98	14	>477

Discussions

The literature suggests using physical therapy in the recovery of patients with dysplasia of the hip or after restoring them, either in the terminal phase of recovery, considering that earlier both hip delay recovery. In this paper we intend to show that in our view the use of recovery since the beginning of the exercise, helps healing, provided their adaptation to the patient's condition.

Conclusions

Establish early treatment and comprehensive analytical kinetic customize each patient is delivering biomechanical parameters of hip.

Established early postoperative treatment leads to:

- Increased joint stability;
- Active mobile sector growth;
- Passive mobility sector growth.

From the point of view of driving scheme for lower limb are obtained:

- Engrams cortical normal neuromotor development by age of the child;
- Correct completion of each phase of gait.

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INFLUENCE OF GAIT THROUGH CONSTRAINT- INDUCED MOVEMENT ON IMPROVING MOTOR CONTROL - CASE STUDY

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Abstract. *Although in recent years the survival rate following an ischemic episode has increased significantly, this is due to medication and not necessarily to a change in lifestyle, which consists in more physical activity and a healthier diet. The purpose of this study was to examine the influence of walking by constraint-induced therapy on the improvement of motor control at the level of the affected limb. The constraint was applied to the healthy lower limb in order to intensely stimulate the impaired one. The research was conducted within the Rosana Medical Polyclinic and included a number of 4 subjects with sequelae of ischemic stroke. The constrained-induced therapy was applied to these patients (by means of a fixed knee orthosis, with the articulation fixed in full extension), consisting in sessions of 30 minutes, distributed in several sub-sessions per day, for a period of 3 weeks, daily, from 8 am up to 9:30 pm. The intense exercise of movement by induced constraint should receive more consideration in terms of improving the motor function of the paretic lower limb.*

Keywords: *induced constraint, motor function, intense practice of movement*

Introduction

Ischemic stroke is one of the most common causes of disability in Romania. Although in recent years the survival rate following an ischemic episode has increased significantly, this is due to medication and not necessarily to a change in lifestyle, which consists in more physical activity and a healthier diet. With the increase in life expectancy after an ischemic episode, the number of persons with ischemic stroke sequelae is steadily rising.

Constraint-induced therapy is one of the most innovative ways to recover movement and motor control in this type of patients. Of course, its application is based on the same model as constraint-induced therapy for the upper limb, the difference being that the lower limb, being a supporting member, has a restriction in its degree of mobility that is not complete but only partial, being enough though to carry out major beneficial changes in the function of the limb.

Intensive gait practice through constraint-induced therapy, applied to the healthy lower limb, gives a strong stimulation to the affected side to effectively find and integrate proper motor programs, so that the coordination between the two limbs is made at an optimal level to ensure a functional movement at normal parameters. An important aspect is that the transfer of motor acquisitions acquired during the exercise will be much easier with regard to the use of the affected limb in various daily activities - activities involving the use of a larger active joint amplitude, such as the elevation of the member while placing the foot on a chair for tying shoelaces or getting into and getting out of bed.

The purpose of this study is to investigate to what extent the intense exercise - and in varying conditions - of movement through constraint-induced therapy manages to improve the motor function of the affected lower limb, so that it can achieve coordinated movements and higher amplitudes.

Purpose of the method

The constraint-induced therapy, integrated into an intense exercise practice and of various exercise derived from movement, automatically leads to a rapid functional recovery of the lower limb, translated by a substantial increase in motor function.

Materials and methods

The study was conducted within the Rosana Medical polyclinic on a group of 4 patients, 3 women and one man, all ages ranging from 60 to 72 years. The criteria for inclusion in the study were autonomy in walking for a distance of at least 50 meters, the patients had to be over the age of 60 and not older than 75 years, a clinical diagnosis of post ischemic stroke hemiparesis of no more than 6 months prior to the study, no recurrence of the ischemic stroke up to the study, no pain of any nature in the lower limbs and a score of at least 24 points on cognitive status, according to the *Mini Mental State Examination* scale. Exclusion criteria were: haemorrhagic stroke, patients with back pain in the lumbar spine and lower limbs, the presence of other conditions that overlap with the neurological syndrome, patients who did not give their consent.

The evaluation was performed initially, before starting treatment, and finally after the completion of the three weeks of constraint-induced therapy. Objectivity was achieved using the Stroke Impairment Assessment Stroke (SIAS) Scale, the 24-point variant, applicable to the lower limb function (Chino and Melvin, 1996, pp. 19-26). As a consequence, the item of the scale referring to the degree of tactile perception was excluded as we considered it not relevant in the present study because the patients, in order to be included in the study, had to initially have this capacity. The same was done for the following items: the amplitude of passive mobility (irrelevant – we were only interested in the motor control on active amplitude), joint pain (exclusion criterion), trunk control, visual-space perception and aphasia (the last three are not directly reported to the function of the lower limb).

The re-educative process consisted in applying a fixed knee orthosis - with the knee locked in maximum extension - on the healthy lower limb. With this orthosis, the patients underwent a re-education program daily from 8 am to 9:30 pm, program that was divided in sub-sessions of 30minutes each, with a break of one hour and half between each session. According to Taub's indications, the duration of the treatment was of 3 weeks. In this way, patients had to perform different variants of walking and various tasks with the upper limbs, concomitantly with walking. Throughout the program, the therapist provided assistance to patients for the entire period in which they were in the kinetotherapyroom (Marc et al., 2013, pp. 753-760). At home, assistance was provided by a caregiver, but only after being carefully instructed by the kinetotherapist.

Results

Considering that the initial average of the scores at group level was of 11.5 (Table 1) and that if we report this average to the total maximum score that can be obtained, which is 24, it results that the group was initially classified at the level of a potential of motor control expression equal with 47.91%. Moreover, starting from this potential, at the end of the three weeks of constraint-induced therapy, the group scored a final average of scores equal with 21.5 (Table 2). This average, reported to the same total score (24), corresponds to a potential of motor control expression of the group of 89.58%.

Following these results, it is found that constraint-induced therapy registered an efficiency of 41.67% and a limit of progress of 10.42% (Fig. 1).

Table 1. *Initial results of subjects and of the group*

	Hip flexion	Knee extension	Ankle flexion, followed by return (repeated 3 times)	Tonus - evaluated by the patellar reflex	Tonus - assessed by resistance to passive mobilization	Kinesthetic perception - assessed by changing the position of the hallux	Total score	Scores average at group level
Subject 1	4	3	2	1	2	2	14	11,5
Subject 2	3	3	2	0	1	1	10	
Subject 3	3	3	2	2	1	1	12	
Subject 4	3	2	1	2	1	1	10	

Table 2. *Final results of the subjects and of the group*

	Hip flexion	Knee extension	Ankle flexion, followed by return (repeated 3 times)	Tonus - evaluated by the Patellar reflex	Tonus - assessed by resistance to passive mobilization	Kinesthetic perception - assessed by changing the position of the hallux	Total score	Scores average at group level
Subject 1	5	5	4	3	3	3	23	21,5
Subject 2	5	5	3	2	3	3	21	
Subject 3	5	5	3	3	3	3	22	
Subject 4	5	4	3	3	3	2	20	

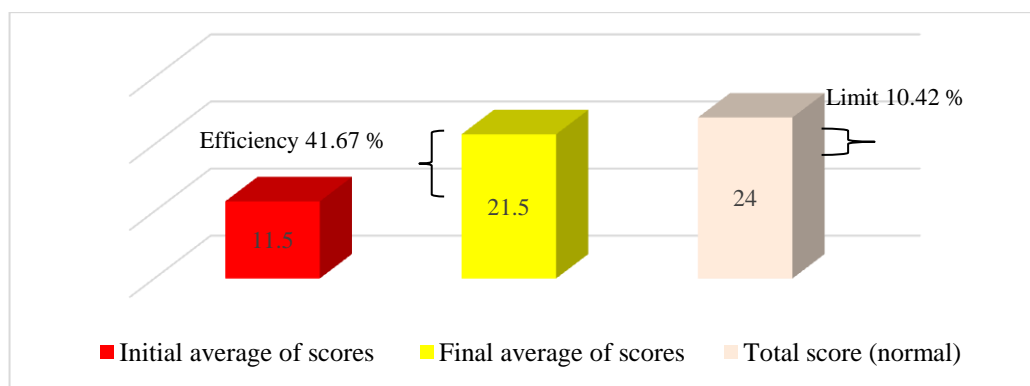


Fig. 1. Graphic representation of the effectiveness and limit of therapy at group level for motor control

Discussions

The intense practice of walking by applying constraint-induced therapy leads to an increase in motor function in the lower limbs. These effects persist after the end of the three weeks period, continuing to last up to approximately 6 months. During treatment, we found that it was impossible to exclude the Hawthorne effect (disturbance of the behaviour of subjects in a study, because they are aware that they are being observed). Both the subjects and the therapist were aware that the treatment was focused more on increasing the parameters to be assessed through the SIAS scale, and less on getting back to a movement as normal as possible. Practically, although constraint induced therapy was carried out in conjunction with walking exercises the patients focused more on improving the functions of active hip flexion, active knee extension, active ankle flexion, and less on improving the qualitative and quantitative parameters of walking.

Conclusions

Regarding the improvement of the motor control for the active hip flexion, we believe that this was mainly due to the effect induced by the motor task - stepping over the obstacles and climbing the steps - initiated with the affected lower limb. Of course, an important role in the increase of function, held in a previous phase, was the movement reflex - integrated in the task of moving with alternating step on a flat surface - which can be said to have “initiated” the hip joint in the attempt to progressively increase the flexion amplitude (and thus its removal from the semi-rigid hip pattern) (Robănescu et al., 2001, pp. 22-23).

Regarding the improvement of the fullest extension of the knee joint, we consider the influence of constraint-induced therapy, especially during unipodal support, to be positive when it becomes necessary to “lock” the joint. In conclusion, the therapy improves the active extension of the knee through the mechanisms of positive feedback response and of the displacement reflex.

Moreover, the improvement of the possibilities of making as correct as possible the active flexion in the ankle articulation is considered also in relation to the therapeutic tasks introduced during the impaired lower limb constraint-induced therapy, within the active flexion function in the ankle articulation. By systematic repetition of such movements the patient put in practice the motor program, which in its turn governs the series of muscular commands preceding the sequence of a movement – in this paper, the sequence consisted in activating all the muscles of the affected lower limb, in order to fix the body concomitantly with the action of the flexors of the hip and of the knee of the affected lower limb, which induced the active flexion of the ankle through the intent process (assisted by the nervous radiation).

Last but not least, we consider that the kinetic function of the first metatarsophalangeal joint was influenced by the induced constraint by the fact that the subjects were determined to adopt a correct support of the foot on the ground (heel initiation, followed by the running of the foot on the ground and then followed by the moment of impulsion). But the most important aspect we consider to be the impulsion moment on the affected limb, because during this phase, in the first phase, the metatarsophalangeal joint is in a position of maximum extension. So the ligaments and flexor muscles are in elongation, resulting in intense discharge at the level of muscle spindles and the Golgi receptors from the muscle-tendon junction. By successively repeating this process, the central nervous system will become aware of the different degrees of stretching and will then know how to compare them.

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USEFUL METHODS OF LEARNING AND DEVELOPMENT FOR EDUCATIONAL ORGANIZATIONS FROM THE SPORTS FIELD: BENCHMARKING / "GOOD" AND "BAD" PRACTICES

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Abstract. *Benchmarking as learning method and managerial practice is based on the comparative use of data in decision-making process on the development / survival of public or private organizations on the market. The method consists in identifying best practices in a particular field of activity, leading to higher performance. The existing school sports clubs (SSC) on national level (102 such organizations, with or without juridical personality) can constructively use the method within a professional network or a learning community. Currently 10.20% of the SSC units have been subjected to external evaluation, but this process will end in the next 3 years, so there will be an external quality assessment report for each organization. The success of the benchmarking method is identifiable not only internally, inside the organizations that can improve, but also externally, at public policy institutions (ministries) that will have solid elements for a realistic evidence-based policies as the only way to develop national strategies who could lead to sport performance improvements.*

Keywords: *professional network, learning community, good practices, bad practices, development strategy.*

Introduction

In the pre-university education system in Romania there are approximately 7,000 public and private legal education units, in which an instructive-educational process takes place from pre-school to post-secondary level. These are included in local school networks, established according to criteria defined by law and in accordance with clearly stated procedures that make up the national education system. The notion of "network" is used at central and local administrative level to position schools by geographic location and identification based on specific elements such as: legal personality, identification code (fiscal code, SIRUES code), name, etc. This term, "network", does not currently cover, as semantics, schools of the same type operating on similar principles, such as kindergarten network, vocational high school network, etc. although operating under a network (networking) can provide important premises for development. The existing school sports clubs (SSC) on national level (102 such organizations, out of which 68 have legal personality and 34 are structures attached to other educational units, <https://www.siiir.edu.ro/carto/>) can form such a network, which is particularly useful in exchanging experience and setting up good practice. In this way, a learning community could, in an appropriate way, influence a national development strategy, developed at the central level.

As schools with additional sports program, the school sports clubs are a special typology within the pre-university system, being also schools and sports structures, registered both in the school networks at the local (county) administrative level and in The Sports Register administered by the relevant ministry. Therefore, these schools have institutional relationships of different types and receive administrative messages from two supervising entities at the central level, namely the ministry of education and the ministry responsible for sport. Compared to all other existing educational units, this situation is unique, so they respect and apply, on the one hand, the provisions of Law no. 1/2011 (Law on National Education) with all subsequent normative acts, and, on the other hand, those of Law no. 69/2000 (Law on physical education and sport). If only the generic notion is to be considered, *club*, an area of polisemantism and homonyms is penetrated, as the "club" designates other institutions in the education sector (*the children's club*, as a provider of extra-curricular education) or the sports sector (*sport club*, as a performance and high-performance generator, subordinated to the Ministry of Youth and Sports) or in the entertainment and loisir area (*retirement club*, for example). As educational organization with additional sports program, SSC provides the necessary link between two social systems, education and sports, being constituted as a step necessary to ensure sport performance.

As demonstrated in various works, identifying good practice may be part of a broader performance improvement strategy (Jupp, 2010). This identification must necessarily be accompanied by a process of dissemination of what is recorded on the ground, as it is unanimously recognized the need to learn from the experience of others, but it is equally recognized that organizational efforts to obtain such information are, for various reasons, insufficient.

That is why the SSC situation requires institutional collaboration with visible effects on "Best Practices Benchmarking" (Jupp, 2010), as a learning method with sustainable effects and as a solution for reviving performance in sport. The used sintagm "Best Practices Benchmarking" it is slightly pleonastic because the common sense only associates the benchmarking method with good practice, but it is justified in the context in which "bad practices" can also be considered negative learning patterns. The external quality evaluation reports produced by the Romanian Agency for Quality Assurance in Pre-university Education are a useful database for identifying good practices as well as less appropriate one's, but real, in terms of SSC. Once made public, these reports must be capitalized by public policy ministries to actually achieve *evidence-based policies* and national strategies for improving performance in sport. At the same time, all institutions involved need to identify the most effective ways to disseminate learning outcomes, for learning purposes. In this work, both "Best Practices Benchmarking" and "Negative analytical induction" will be used, last one for revealing in general and for the purpose of learning of bad practices, negative or critical cases (Jupp, 2010) through the general and non-exhaustive presentation of results achieved by 10 SSC evaluated externally between 2015 and 2017.

Problem Statement

Benchmarking as learning method and managerial practice is based on the comparative use of data in decision-making process on the development/ survival of public or private organizations on the market. The method consists in identifying best practices in a particular field of activity, leading to higher performance. From an organization's point of view, practicing benchmarking means going for the best methods used in an activity, these methods allowing the organization to improve its results.

The benchmarking concept, which comes from the English word *benchmark* ("milestone", "landmark"), is broaded practiced in the US, but has known international expansion in recent decades. The method consists of a systematic and permanent process of measuring and comparing the work processes of an organization with those of another one, in order to increase performance. It necessarily involves measurement and can be a learning method in an organization about areas and the way that activity could be improved (Miroiu et al., 2011). A possible expression of this in terms of sports field is *to make a comparison with the champions in a certain field*, to use their experience to bring excellence closer.

The organizations can apply this method themselves, obviously as they are interested in improvement, there is public information and there is a need to operate in a quality system, in the sense of systematically conducting internal and external processes of evaluation of the outcomes. On the other hand, the method may also be useful to other organizations, superordinate, responsible for public policy, in order to provide the best measures to improve the performance of a particular system, based on a projected and expected performance level.

For educational organizations in sport, this method generally used at management level could meet a favorable aperceptive background, because notions like *record*, *superior result*, *success*, *performance*, either at the level of a single athlete, or in absolute value, are part of their daily routines and are vectors that direct sport training, as the main activity. In sports literature, performance is an essentially element, according to which the whole activity is oriented. Thus, sport performance is defined as "motric performance achieved in an institutionalized social comparison context, implying inequality in the distribution of rewards" (Teodorescu, 2009, p. 15). Increasing the performance level of its own athletes compared to the reference level in the sporting branch is the focus of sports training in the performance sport subsystem, which involves continuous measurement and comparison.

Although school sports clubs have institutional relationships with two overhead entities at central level, namely the Ministry of Education and the Ministry of Sport, their functioning and funding are carried out by the Ministry of Education, which is why these educational establishments have the obligation to implement the quality assurance mechanisms in education stipulated by national quality legislation, therefore: to carry out annual self-evaluation and to report publicly, be evaluated externally every 5 years and to make public reporting on the level of quality provided, based on 43 indicators. Although the indicators are the same for all schools, so the measurement process there are no individualization, differentiation necessary in conjunction with SSCs specificities, however, the measurement based on them creates the premises for the comparability of the results obtained by SSC both with the other schools in the pre-university system and especially with similar organizations. The scores obtained at the periodic external evaluation, weighted by the efficiency index used by the national external evaluation body, lead to the creation of hierarchies, so the benchmarking process is thus facilitated. The current context in our country reveals that, on one hand, mechanisms are created to measure externally performance at a given time, systematically, so in the education system can be established "milestones" against which to report and compare, but that, on the other hand, it is necessary to have internal interest (locally

supported) of management to maintain the organization at a certain level of competitiveness. In the profile literature, it is emphasized that it is not absolutely necessary to identify best practice in absolute terms for benchmarking to be successful and lead to improvement; good or superior practice is considered a more appropriate phase and, in this respect, the current outcomes of 10 SSC external evaluations (reports) can provide sufficient information to configure "good practice".

The application of benchmarking in the network of school sports clubs is now possible, because the first necessary steps have been taken, in the last 3 years, 10 units of this category have been externally evaluated. Education with additional sports program now covers 102 independent school sports clubs and school sports clubs / school sports club sections in other schools (namely highschools), therefore generally serving the age group 14-18 (19) years with all its characteristics in the psychosomatic development, but they can also target shorter age segments for beginners or cadets (depending on the different sport disciplines). The educational establishments in which supplementary sports education is organized operate on the basis of general and specific legislation, developed mainly by the Ministry of Education, which is their initiator. Thus, the SSC is set up by this ministry, at the proposal of the school inspectorates, which have a role in determining their status of independent units or sections/ groups on sports disciplines in other localities of the county. Functioning with sections/ groups delocalisation may be favorable to the process of selection and training of children with skills for different sporting disciplines, as an immediate institutional response to the locally identified needs of the beneficiaries. SSC uses a specific framework plan, school curricula on sports disciplines, schooling plan and organization and functioning regulations, developed by the Ministry of Education. Equally, in order to fulfill their mission according to which they were established, these schools participate in official and friendly competitions, national and international, included in the sports calendar both of the Ministry of National Education, of the national sports federations, as well as in their own sports calendar and other sports organizations. To participate in competitions of national sports federations, SSC enrolls in the Sports Register and joins the national sports federations, so they comply with the rules and regulations established by them. The territorial distribution of the SSC on the development regions of Romania is represented in Fig. 1.

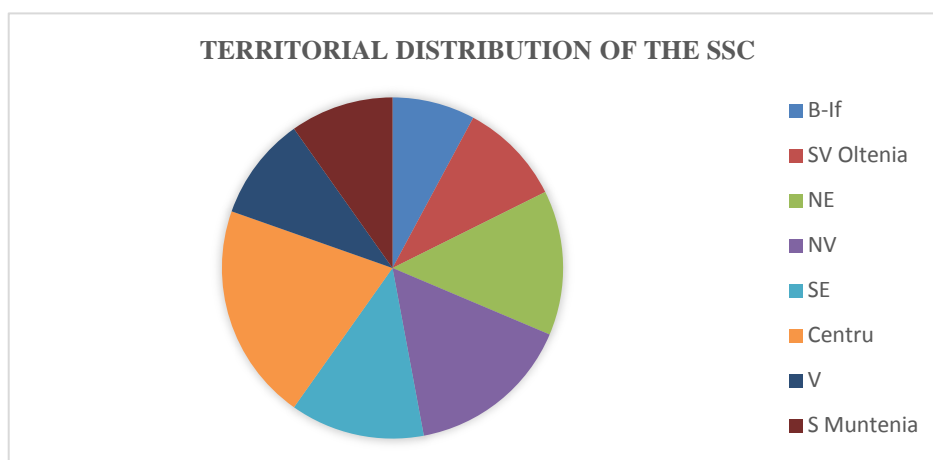


Fig. 1. The territorial distribution of the SSC on the development regions of Romania

At present, 10.20% of the units in this category have been subjected to external evaluation (10 school sports clubs, whose national distribution was represented in Fig. 2, in relation to the other SSC that will enter the external evaluation process). In the next 3 years, this process will end, so there will be an external quality assessment report for each SSC.

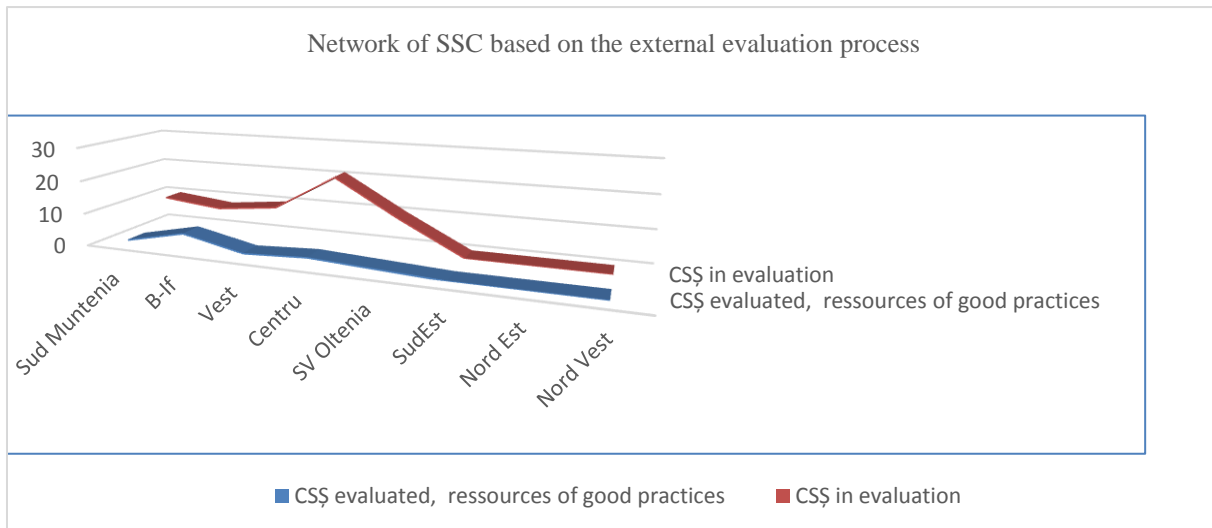


Fig. 2. Network of SSC based on the external evaluation process

These educational establishments have a special operating regime and can be considered as a professional network, if they are constituted in a learning community. Thus, with some first results, good practices can be defined in the interest of a wide range of actors: SSC that have been evaluated, but where many areas of improvement have been identified and remedial deadlines have been granted; SSC under evaluation, who can become organizations that learn from notable (or shortcomings) results of those evaluated; the Ministry of Education as a financier that could set outcome levels as a condition for differentiated funding, in cooperation with the Ministry of Sports as responsible for the national strategy for sport; the national evaluation body (the Romanian Agency for Quality Assurance in Pre-university Education - ARACIP) that could define and implement evaluation mechanisms specific to niche institutions, such as the SSC. Also, these first findings based on actual results, recorded on the ground in the external evaluation process, may be the starting point for some revisions of the evaluation tools currently in use (platform, reports, efficiency index) for their adaptation to the peculiarities of operation of organizations such as SSC.

Analyzing some aspects specific to SSC operation in our country, drawn from the external evaluation reports from the units with maximum scores (quality level *very good*), the benchmarking method, by reference to the good practices encountered, leads to the following benchmarks (references) for ideal operation of a SSC, to which should aspire:

- all human resources are stable, has no fluctuations, 100% qualified, consists of teacher-coaches with teaching degrees, concerned about continuous professional training and scientific research in the branch of sport in which they are employed (aspect identified in 8 out of 10 SSC), with training both in the country (in national context) and abroad (in international context);
- all groups of students-athletes carry out activities in semi-olympic training facilities, corresponding to each sport branch (stadium, nautical base, gym, etc.) with all conditions for security and sanogenesis being ensured (2 SSC);
- all sporting sectors, in which sports training is carried out, are successful in national and international competitions (6 SSC);
- all teacher-coaches use audio-video resources in sports training (1 SSC);
- each student-athlete progresses in preparation, letically recorded in teachers-coaches own catalogs (6 SSC);
- rate results, obtained by reporting the number of prizes/ medals at competitions at national and international level to the total number of certified athletes, is 1,06 (each legitimate athletic student has at least one national/ international level result – 1 SSC). It should be noted at this "landmark" that, despite the fact that the number of schools in the sports field is very low compared to the other units in the national education system, yet it is a non-unitary practice regarding the definition of sport result in terms of *qualification, competitive level, trophy, medal, cup*, etc an identical approach and common correlation and quantification factors being necessary;

- external communication with beneficiaries and external partners is achieved both traditionally, face to face (7 SSC) and electronic (3 SSC), with effects in selecting students with skills (the number of legitimate students-athletes registered a 10% increase in SSC using the Internet compared to those who promote their educational offer exclusively by traditional means);
- the annual increase of the financial allocations is 33%, achieved by results allocations, but also by allocations from other sources (sponsorships) identified by management (1 SSC).

As for the "negative analytical induction", that is, revealing in general terms and for learning purposes the "bad practices", the reality of the SSC's functioning at the moment indicates the following:

- there is no medical chamber with its own staff, there are not provided by means of internal programs personalized medical supervision and nutrition for certified students-athletes (10 SSC);
- there are no job positions and there are no qualified staff for guidance and counseling issues (10 SSC). It should be noted that there are SSC for which psychological counseling (psychological training) and orientation on sporting branches are carried out by the teachers-trainers, without excluding the need for qualified staff;
- there are not implemented, in legal terms, consortia as collaborative space, although this issue is covered by existing legislation, especially regarding the sharing of material resources (sports infrastructure and information resources, eg. Library or Information and Documentation Center), so there are confusions generated by the common functioning of SSC and sport clubs (2 cases);
- the educational offer is not adequate to the results obtained by sports sector (3 SSC), so that branches reporting no results but for which there is interest are maintained and financed (eg. football);
- although the same number of staff is maintained, the allocated funding is showing a negative growth (decrease from one year to another by up to 16%, registered at 2 SSC out of 10). Insufficient funding determines the financial intervention of parents in order to be able to participate in national and international competitions (5 SSC);
- there are no job positions for auxiliary activities (secretaryship, IT), necessary for the accomplishment of the SSC mission, which aims not only at training but also on the selection and promotion of students-athletes, job positions useful in documenting internal activities, to relieve the teacher-coaches of bureaucratic tasks (8 SSC).

Conclusions

Benchmarking of good and bad practices can be a useful way to improve the activity of school sports clubs, in terms of their mutual information through a professional network (a learning community), which can facilitate new ways of understanding and a holistic reflection based on specificities (Neacșu, 2010).

Applied external standards, which measures the quality of all schools in our country must and can help identify opportunities to improve SSC activity, to identify "good practices" in their field of activity; but alongside standards-based measurements, there is also a need for desire and willingness to learn from the "good" or "bad" practices recorded. For this, it is necessary to overcome the internal resistance to making the right and necessary change, by delivering effective trust-based communication with all local and central superordinate entities.

What and how other similar organizations have achieved are aspects that can be adapted and incorporated into their own organizational processes, but are mandatory elements of analysis by the relevant ministry (Ministry of Youth and Sports), in order to realistically set the strategic development targets in the national strategy for sports development (*evidence-based policy*).

Last but not least, the education reform process undertaken in Romania which led to redefining roles and activities, in accordance with a new instructional design, must support the valuable traditional aspects in the functioning of SSC organizations and to facilitate the creation of the necessary correlations with the innovative elements (standards, indicators, rules etc).

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THE SHORT-TERM EFFECT OF KINESIO® TAPING APPLICATIONS ON MUSCLE TONUS IN PRETEENS WITH FUNCTIONAL SCOLIOSIS

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Abstract. *Kinesio® Taping is seen as a complementary tape therapy, a recovery method designed to facilitate the natural healing process of the human body. It is a way of improving the function of the tissues and the physiological system. The present study aims to identify the short-term effect (3 days) of the kinesiological tape applied on the muscular groups involved in the functional scoliosis formation, which should influence the possibility of aspiration of the spine for postural recovery. The evolution of the muscle tonus parameter and elasticity parameter for the evaluated muscles through the Myoton device was followed. Subjects in the study, 13 preteens aged 7 to 12 years, were tested before and after 3 days following the application of Kinesio® Taping. The results obtained in the evaluation of the parameters for the experimental group showed statistically significant progress at a $p < 0.05$ for the elasticity parameter, which leads to the partial validity of our study and arouses the interest of insisting on the subject.*

Keywords: *Kinesio® Taping, muscle tonus, preteens, functional scoliosis.*

Introduction

Poor postural habits and physical inactivity are associated with asymmetric use of body during functional activities. In time, such musculoskeletal imbalance can cause changes in posture (Juinior and Tomaz, 2008). The high prevalence of postural defects (Ciaccia et al., 2017) in children creates an objective in research and in promoting therapies that could stop the development of the situation. Most of postural deficits start with functional scoliosis and end up in structural scoliosis. Most of international studies are related to idiopathic scoliosis and structural scoliosis, therefore, there is poor information regarding functional scoliosis, which is defined as non-structural scoliosis that involves a temporary change in spinal curvature due to poor muscle development, difference in leg length, inflammatory conditions, but most important, muscle imbalance.

The literature describes various methods and therapeutic techniques that have been used to improve postural problems. These techniques include physical exercises, electrical stimulation of the muscles (either in isolation or in association with exercise), reorganization of phasic and tonic posturing, osteopathy, Global Postural Re-education (RPG) and isostretching, among others (Oliveiras and Souza, 2004).

As a complementary technique to all of the methods mentioned above, which is also a method that promotes muscle recovery, we approached in our study Kinesio® Taping therapy. It is a relatively new technique used in Romania for over 10 years, used for athletes as well as in orthopedic, pediatric, cardiovascular, neurological departments. It may be that an elastic tape might cause proprioceptive stimulation while at the same time not limiting the enhancement of improved joint range of motion and thigh muscle function during rehabilitation. One such elastic tape is called Kinesio® Tape, long used for rehabilitation and during athletic competition in countries such as Japan, but not introduced into the United States until 1995. Kinesio® Tape is a relatively unique tape that is capable of stretching up to 130-140% of its resting state, may either be used as a compressive or non-compressive external adjunct to rehabilitation, is approximately the same weight and thickness of skin, and has no medicinal qualities. In addition, Kinesio® Tape is reported to be hypoallergenic and, due to its construction, allows the skin to breath (Murray, 2000).

When the application procedure is followed correctly, the taped area can be used to facilitate a weakened muscle or to relax an overused muscle. The method for applying the tape varies depending on the specific goals: improve active range of motion, relieve pain, adjust misalignment, or improve lymphatic circulation (Kase, Wallis and Kase, 2003). Taping provides immediate sensorimotor feedback regarding functional abilities. With the Kinesio Tape applied, patients often report symptom relief, improved comfort level, or stability (Yasukawa, Patel and Sisung, 2006).

Any action supporting muscle function is extremely important for post-injury and orthopedic patients as well as for athletes (Slupik et al., 2007), but little is known about the effects of this tape in case of postural deficiencies. The literature contains no EBM-compliant studies that confirm the efficacy of Kinesio dearth of research on the subject also means that our understanding of mechanisms of Kinesio action is insufficient (Slupik et al., 2007).

Although physical therapists use Kinesio Taping in clinical practice, scientific evidence investigating its effectiveness is limited (Gonzalez et al., 2009).

The objective of this study was to assess the effectiveness of Kinesio® Tape method in the improvement of non-structural scoliosis, while highlighting the scientific investigated evidence of the activity of the muscles influenced by the applications.

Methods

The experimental group of the study included 13 children, preteens (9 girls, 4 boys, 7-12 years of age). Subjects were accepted in the trial after evaluating the inclusion criteria: diagnosed postural deficiency was functional scoliosis or non-structural scoliosis, with the possibility of participating in the trial, imbalanced muscle tonus, urban belonging and because they were minors, a written consent was signed by a parent, so that we can apply the Kinesio® Tape. The permission for involving in this research was granted from the tutor's subjects who participated in the study. To avoid any disagreements the subjects were all evaluated by the same therapist.

The study took place at a private medical recovery Clinique from Craiova, where the children were clearly informed about the steps which they would follow during the trial. It's been explained the benefits of the Kinesio® Taping application and how it will be applied, with the purpose of maintaining the correct posture, after recovery treatment, over a longer period, more precisely, during the time when the subjects perform other activities.

The application method required a relaxed posture adopted by the subjects, in orthostatism, throughout the process. The tapes were placed on the connective tissue, cut into the I-shape and with a suitable length for each individual's work area, the tape being applied to the clean skin after the paper sheet was removed.

The first portion of the tape, not more than 5 cm, was glued to the conjugate tissue without any tension and we added friction to that area so that the acrylic glue will activate. This first portion is called anchor. Depending on the desired effect, they were applied with a certain tension and in a certain direction.

Applied from the distal to the proximal (15-25%), the application will rebound to the anchor to inhibit the tense muscles and apply from proximal to distal (origin to insertion), with a 15- 35%, the tape will rebound to anchor to facilitate weak muscle.

An important addition to the correct application method is a stretched tissue. During the application the subject will perform a position that will allow the tissue to stretch so that the sensory receptors could have a better tape connection and thus a more conclusive reaction of the muscles.

The applications were made taking into account the muscular groups involved in the treated pathology. The muscle groups on which the tape was applied were the following: **erector spinae**, **longissimus lumborum**, **trapezius superior** and **pectoralis major**.

Application method for **trapezius superior** muscle: Subjects were positioned in standing. In the area of the skin projection of the affected muscle, the tissue was stretched by a lateral tilt of the head. Since in most cases the muscle was tense, the application has been designed to inhibit overworked muscles, more precisely from the distal to the proximal (insertion-origin). We started with the tape on the deltoid muscle region with a tension of 25% and we applied the tape across the entire surface of the upper trapezius muscle up to the neck, close to the mastoid process.

Application method for **erector spinae** and **longissimus lumborum** muscle: The starting position was standing. In the area of the skin projection of the affected muscle, the tissue was stretched by an anterior flexion of trunk. The application was designed to facilitate weak muscles, more precisely from the proximal to the distal (origin-insertion). Typically, the muscle group in the convexity area is elongated, so weak, so we started with the tape from the iliac crest on the Longissimus lumborum cutaneous projection of the lumbar convexity and we continued diagonally to the Erector spinae muscle from the thoracic convexity. Tape tension was 35%.

Application method for **pectoralis major** muscle: Subjects were asked to stand. The tissue was stretched by a rear projection motion of the shoulder allowing the stretching of the pectoralis major muscle. For this muscle, the tendency is to shorten and position the shoulder anteriorly. The application was made to inhibit tense muscles with a technique that will overcome a lever. Initially, the tape will start from the sternum area, which will involve a proximal to distal alternative (origin-insertion) that normally helps to facilitate the muscle. Due to the fact that this application exceeds the insertion of the trapezium muscle and continues on the shoulder area reaching its lower angle, it will cause the rebound force to move from the distal to the proximal and thus create an application that will have as direction from the distal area to the proximal one, allowing for the muscular inhibition in question to happen. The tension will be applied at 25%.

Because a functional scoliosis often involves a high hip, we have created an application that will posture and support the joint during movements, influencing the total correction. In the case of structural scoliosis, the hip on

the same side of the thoracic convexity will be higher due to lumbar convexity. As far as the non-structural scoliosis is concerned, it is a translation of the hip on the diagonal of the assumed thoracic convexity, as a compensatory projection.

The final image of the Kinesio® Taping application will have to consider higher shoulder correction by relaxing the *trapezius superior*, posterior projection of the shoulder by influencing the *pectoralis major* muscle, correction of the assumed thoracic convexity (gibus) by facilitating the spinal muscles, correcting the supposed lumbar convexity by facilitating the longissimus lumborum muscle and blocking hip translation (Fig.1, Fig. 2, Fig. 3 and Fig. 4).



Fig 1. Posterior view (before application)



Fig 2. Posterior view (after application)



Fig 3. Lateral view (before application)



Fig 4. Lateral view (after application)

To measure muscle tone, we used a device called Myometrum/ Myoton that incorporates a software designed to collect information about muscle activity. It's purpose was to measure and record the deep oscillations of soft biological tissue in the form of an acceleration signal. Oscillations are induced by a fast and light release force from the outside, as a mechanical impulse given by a plastic needle incorporated in the device which is constantly loading the tissue. The measurement is made with the subject in a horizontal relaxed position, made bilaterally on muscle projection, on the muscle spindle.

This method is non-invasive, painless and relatively easy to administer. According to the preinstalled software, we created a pattern that included the muscles mentioned before, which were considered necessary in functional scoliosis assessment.

It was used as a Triple Scanning method, which compares the condition of right and left side muscles, estimates the direction over a period, comparing population norms, and expressing multiple muscle groups.

All data will be entered in a PDF format containing comparative graphs, where the values of **frequency** (muscle tonus) and **decrement** (elasticity) values will be taken into consideration (Fig. 5).

Measurement profile					Relaxed			Contracted			Force	Decr	Stiff
Tissue	Object	Pos	Side	Loc	Freq Hz	Decr	Stiff N/m	Freq Hz	Decr	Stiff N/m	index	index	index
Muscle	Erector Spin	Lying	Right	Central	17.7	1.33	380	--	--	--	--	--	--
					13.5 - 15.9	1.34 - 1.67	267 - 347						
Muscle	Erector Spin	Lying	Left	Central	16.2	0.85	251	--	--	--	--	--	--
					13.7 - 15.9	1.42 - 1.72	277 - 349						
Symmetry index (%)					4.42	22.02	20.44	--	--	--	--	--	--
Muscle	Longis Lumb	Lying	Right	Central	13.4	1.08	304	--	--	--	--	--	--
Muscle	Longis Lumb	Lying	Left	Central	12.4	0.96	221	--	--	--	--	--	--
Symmetry index (%)					3.88	5.88	15.81	--	--	--	--	--	--
Muscle	Pector Maj	Lying	Right	Central	10.4	1.24	158	--	--	--	--	--	--
Muscle	Pector Maj	Lying	Left	Central	10.3	1.52	174	--	--	--	--	--	--
Symmetry index (%)					0.48	-10.14	-4.82	--	--	--	--	--	--
Muscle	Trapez up p	Lying	Right	Central	11.6	1.54	245	--	--	--	--	--	--
					9.6 - 11.0	1.04 - 1.22	207 - 247						
Muscle	Trapez up p	Lying	Left	Central	6.7	1.19	238	--	--	--	--	--	--
					9.7 - 11.1	1.04 - 1.24	209 - 249						
Symmetry index (%)					26.78	12.82	1.45	--	--	--	--	--	--

Fig 5. Triple Scan graphic evaluation

For the statistical analyses we used Statistical Package for Social Science version 21.0, Non Parametric test, Wilcoxon, in order to highlight the differences in the initial and final testing, the significant level being at $p < 0.05$, which shows us if there is a significant difference/ association in our study.

Results and discussion

Table 1 presents the initial results of the muscle tonus evaluation recorded by the subjects of the experimental group regarding the parameters of frequency and decrement. In normal muscle condition, the values of frequency parameter should be lower than the values of decrement parameter. According to this, in the evaluation made before applying Kinesio® Taping we observe a difference between the two parameters in the values of longissimus lumbar muscle, where we have an average of 0.81 (± 3.29) for the frequency parameter and an average of -3.26 (± 9.42) for the decrement parameter, which means that the tonus values are higher than the elasticity values. We find the same situation in the case of the trapezius superior muscles where the average of frequency parameter is -7.23 (± 6.64) and the average of decrement parameter is -0.40 (± 15.35).

Table 1. Initial results of the muscle tone evaluation recorded before applying Kinesio® Taping

	Minimum	Maximum	Mean	Std. Deviation
Frequency of m. Erector Spinae	-4.19	11.92	2.44	4.24
Decrement of m. Erector Spinae	-16.06	21.52	7.30	9.82
Frequency of m. Longissimus Lumborum	-5.23	4.23	0.81	3.29
Decrement of m. Longissimus Lumborum	-20.18	13.36	-3.26	9.42
Frequency of m. Pectoralis Major	-14.91	8.15	-0.95	5.47
Decrement of m. Pectoralis Major	-23.91	10.39	0.00	9.58
Frequency of m. Trapezius Superior	-11.25	7.84	-7.23	6.64
Decrement m. Trapezius Superior	-13.95	47.17	-0.40	15.35

Table 2 presents the results of the muscle tonus evaluation recorded by the subjects of the experimental group regarding the parameters of frequency and decrement, after applying Kinesio® Taping and being worn for 3 days. The results shown important modification in the values of frequency and decrement parameter for longissimus lumborum muscle, in which the values for frequency parameter registered the average of 0.00 (± 3.68) and the values for decrement registered the average of 8.40 (± 9.65), fact that highlights the important increase in elasticity values.

Table 2. Results of the muscle tone evaluation recorded after 3 days of wearing Kinesio® Taping applications

	Minimum	Maximum	Mean	Std. Deviation
Frequency of m. Erector Spinae	-13.68	9.15	0.93	6.20
Decrement of m. Erector Spinae	-10.04	24.20	15.05	10.50
Frequency of m. Lungissimus Lumborum	-5.39	5.33	0.00	3.68
Decrement of m. Lungissimus Lumborul	17.82	18.35	8.40	9.65
Frequency of m. Pectoralis Major	-9.70	7.54	0.47	4.14
Decrement of m. Pectoralis Major	-31.95	4.65	-11.50	9.88
Frequency of m. Trapezius Superior	-44.14	35.14	4.29	22.39
Decrement m. Trapezius Superior	-41.53	41.33	-1.72	24.71

Regarding the comparison between the initial and final evaluation (after 3 days of wearing Kinesio® Taping) of muscle tone is seen in table 3 and by applying Wilcoxon test we obtained for elasticity parameter a value of T ($p = 0.01$) for longissimus lumbaris muscle and T ($p = 0.02$) for pectoralis major muscle. This result indicates that Kinesio® Taping applications maintained for three days and evaluated immediately for the elasticity parameter recorded an improvement, the mean difference being statistically significant at a $p < 0.05$, which validated our aim of the study and highlights the fact that kinesiologicial tape can influence the “structure” of the muscle.

Table 3. Results of compared initial and final (after 3 days) values in the evaluation of muscle tonus

	Before	After	Wilcoxon (p)
Frequency of m. Erector Spinae	2.44 (0.28/5.99)	0.93 (-3.65/4.42)	0.46
Decrement of m. Erector Spinae	7.30 (3.23/12.76)	15.05 (5.02/22.02)	0.24
Frequency of m. Lungissimus Lumborum	0.81 (-3.10/1.63)	0.00 (-3.77/3.42)	0.86
Decrement of m. Lungissimus Lumborul	-3.26 (-6.45/0.00)	8.40 (0.00/9.91)	0.01
Frequency of m. Pectoralis Major	-0.95 (-3.38/1.02)	0.47 (-1.59/2.73)	0.20
Decrement of m. Pectoralis Major	0.00 (-8.40/4.59)	-11.5 (-19.8/-8.68)	0.02
Frequency of m. Trapezius Superior	-7.23 (-8.61/1.23)	4.29 (0.00/26.7)	0.10
Decrement m. Trapezius Superior	-0.40 (-6.33/4.60)	-1.72 (-13.5/12.8)	0.86

Conclusions

After statistically analyzing the values recorded by the subjects, it was noted that the applications of Kinesio® Taping (kinesiology tape) can influence the postural behavior of non-structural scoliosis, giving the support needed to correct a deficiency in posture.

For three-day strips as an acute effect of the application, an increase value of elasticity in case of Lungissimus Lumborum muscle was observed in subjects in the experimental group, which is the result of the muscle tone assessment, where the Wilcoxon test is scored for the elasticity parameter at a threshold of significance $p = 0.01$. This result indicates that conventional three-days Kinesio® Taping applications, which were immediately evaluated for this elasticity parameter, recorded an improvement, with the mean difference being statistically

significant at a $p < 0.05$ threshold. The validation of the hypothesis that the application of the bands for only three days induces changes in the postural attitude can be only partially confirmed because the elasticity parameter for the pectoralis major muscle has decreased, which gives an increased tonus.

Based on the results it is understood that the kinesiology tape approach used for non-structural scoliosis can be included in the treatment schedule, and furthermore researched should be made so that a better approach could properly correct postural scheme.

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OBESITY PREVENTION IN OVERWEIGHT CHILDREN THROUGH A COMBINATION OF DANCE AND DIET

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Abstract. *Childhood obesity is an alarming public health challenge which many countries are faced with nowadays. Overweight children have a higher risk to develop obesity associated diseases later in adulthood and are more predisposed towards depression and lower socio-economic status. Physical activity combined with a well-balanced dietary program designed to meet the individual nutritional needs are two efficient tools to overcome obesity. In our study we investigated the effects of latino dancing and a healthy and nutritionally complete diet on the Body Mass Index (BMI) of 11 and 12 years old children. Fifty gymnasium children took part in our study, 25 of them being placed in the control group and 25 undergoing a 3 months program consisting in weekly latino dance training and following a diet designed to meet the nutritional requirements for children of their age. The BMI of both groups was assessed at four different time points (T0 – time 0, beginning of study, T1 - one month later, T2 - two months later, T3 - three months later). At the end of the study, there was a significant decrease in the BMI of the experimental group from T0 to T3. However, in the control group, the number of overweight children increased, with a total of 24 out of 25 being diagnosed as overweight. We conclude that a balanced diet together with regular dance training is a good method to decrease the number of overweight children in Romania.*

Keywords: *child obesity, prevention, dance, diet.*

Introduction

Childhood obesity is a growing public health issue in many countries worldwide, with an increasing financial burden for the overall society. It is estimated that over 41 million children worldwide are overweight or obese and that 92 million are at risk of becoming overweight (World Health Organization Statistics). In 2013, in Romania, 26.75% of 8-years old children have been diagnosed as overweight and 11.64% as obese, according to Romanian National Institute of Public Health (INSP).

Generally, obesity is caused by a combination of factors including lack of physical activity, unhealthy eating habits, low metabolism and genetic predisposition. Obese children and adolescents are more predisposed to social isolation, depression, lower self-esteem and a lower socio-economic status in the future. Additionally, childhood obesity highly increases the risk for adulthood obesity up to 5 times (Parizkova and Hills, 2008, pp. 14-17).

Physical activity, specifically dance, has various beneficial effects over the human body, mood and spirit. At the body level, dance helps in releasing tension, improving muscular tone, sharpening balance, increasing spatial awareness and refining coordination and flexibility (Better Health Channel). Psychologically, dancing helps people to progressively acquire a higher self-confidence and self-esteem, socialize easier, and cope better with stress and anxiety. Moreover, dance can also improve brain health, with evidence showing that dance was the only leisure physical activity (out of 11 different such as golfing, swimming or tennis) to lower the risk of dementia (Verghese et al., 2003, p. 2513). Along with physical activity, a well-balanced diet, designed to meet the specific needs of an individual can significantly lead to an overall healthier status and can help prevent or overcome obesity.

The objective of our research was to study the impact of a well-defined physical activity program (involving dance and pre-established diet) on the body weight of overweight children between 11 and 12 years old.

Our hypothesis was that a well-balanced, healthier diet designed to meet the nutritional needs of 11-12 years old children, together with a systematic program consisting in different types of dance over a period of 3 months will lead to a significant decrease in the body weight of the studied children.

Materials and methods

Participants

Fifty children (14 males and 36 females) between 11 and 12 years old with an initial Body Mass Index (BMI) (a measure of an individual body weight based on weight and height) between 20 and 26 were selected to participate in the current study. All of the participants are gymnasium pupils (the 5th and the 6th grade), studying in 4 different schools from the county of Călărași (School No. 1 Modelu, School No. 2 Modelu, School No. 2

Călărași and School No. 5 Călărași). Parental consent was obtained for each participant prior to the beginning of the study. At the beginning of the study the participants were randomly divided in two equally matched groups in terms of number of participants (25 per group), age, sex and BMI. In both groups, the number of females was higher than the number of males (control group: 17 females and 8 males; experimental group: 19 females and 6 males). Our hypothesis was that a well-balanced, healthier diet designed to meet the nutritional needs of 11-12 years old children, together with a systematic program consisting in different types of dance over a period of 3 months will lead to a significant decrease in the body weight of the studied children.

Procedure

The current study was conducted over a *three months period* (07 July – 20 September 2014), during the participants summer holidays. During this period, the experimental group underwent a pre-defined program consisting in physical activity and a dietary program.

As far as the *physical activity program* is concerned, during these three months, the children practiced 3 times a week, for 1h30 minutes each session, 5 different Latino dances, specifically Rumba, Samba, Paso Doble, Cha Cha Cha and Jive, each dancing style being allocated 15 minutes per session, with one-minute break in-between each style. At the end of each dancing session, a ten-minutes stretching round (consisting of 4 different exercises: "cat stretch", "mermaid", "saw" and "rolling-like-a-ball") was performed to allow the body to recover and to reduce possible following muscular soreness.

The *dietary program* administered in the current study was created by the researcher together with Ana Staraș, MD, specialized in family medicine and with competencies in nutrition and dietology. The dietary program (consisting of 12 different dietary regimes for every week) aimed to meet the nutritional needs of the subjects (taking into account their age and developmental stage) yet taking into account the financial possibilities of the families of the participants. The daily meals were divided as follows: breakfast (8:00 – 9:00 a.m.), snack 1 (11:00 a.m), lunch (13:00 -13h30 p.m.), snack 2 (15:00 p.m), dinner (18.30 - 19:00 p.m.), with two liters of water recommended for consumption. Carbonated, sweetened juices were not allowed during the experimental period of the study. The daily caloric intake for each participant belonging to the experimental group was between 1960 - 2000 kcal, consisting of 120g proteins, 50g lipids and 250g of carbohydrates. An example of a weekly dietary program is provided in table 1. Before the beginning of the study, a meeting was organized by the researcher with the families of the experimental group participants in which they were informed about the overall schedule of the study (periods of trainings and assessments) and were given the weekly dietary schedules for the three months study period.

The control group did not receive any dietary or physical activity treatment during the three months study period.

Instruments

The Body Mass Index (BMI) was used to assess the weight of each participant of the study (belonging to both experimental and control groups). The BMI of each participant was assessed at four different time (T) points: at the beginning of the study (T0), one month later (T2), two months later (T3) and three months later, at the end of the experiment (T3). In the end, we performed a within-group analysis (comparing the BMI of each group from T0 to T3) and then a between-group analysis (comparing the overall results from T0 to T3 of control *versus* experimental groups).

Table 1. *Example of a weekly dietary program administered to the experimental group over the study period.*

<i>Week 1:</i>	<i>1985,8 calories; proteins – 120g, lipids – 46g, glucides – 260g.</i>
Breakfast:	milk (250 ml), bread (30g), butter (5g), honey (20g), bacon (50g);
Snack 1:	one banana or watermelon (200g);
Lunch:	vegetable soup (potatoes, carrots, greens, 200g), 2 slices of wholemeal bread, grilled beef (or chicken) (150 g);
Snack 2:	peanuts or walnuts (30g);
Dinner:	grilled or baked fish (150g), legumes (100g);

Results

In the current study we assessed the impact of a pre-defined program consisting in diet and physical exercise through dance, over a three months period, in a population composed of 11 to 12 years old children from Romania. We observed a statistically significant difference in the BMI of the *experimental group* before and after the diet and dance treatment (mean BMI at T0 = 23.04, SD=0.24; mean BMI at T3 = 20.84, SD=0.18) compared to the BMI of the *control group* (mean BMI at T0 = 23.19, SD=0.16; mean at BMI T3 = 23.94, SD=0.19) (Fig.1).

In the *control group*, the number of children with a lower weight (36-50 kg) decreases constantly from T0 to T3 whereas the number of children with higher weight (over 56 kg) increases constantly (from 8 to 12). We observed however the opposite situation in the *experimental group*, where there is a constant increase in the number of children with less kilograms (38-50 kg) and a constant decrease in the number of children weighting over 56 kg, from T0 to T3.

In the *experimental group*, out of 25 overweight children at the beginning of the experiment, 23 children managed to reach a normal weight after 3 months of diet and dancing, with only two kids remaining overweight. However, in the *control group*, 24 out of 25 children remained overweight, with one of them being obese (for the international standards of defining the overweight and obese categories for children see Cole et al., 2000, p. 4).

The age and the sex and the children played a significant role in their BMI values. In the *control group*, there is a relevant increase in the BMI of 11 years old children compared to their 12 years old peers in between the times of measurements (Table 2).

Table 2. Mean Values BMI (Body Mass Index) of Control Group differentiated on Gender and Age

BMI	Gender		Age	
	Male Mean	Female Mean	11 years Mean	12 years Mean
T0	23.19	23.20	23.08	23.28
T1	23.20	23.43	23.44	23.30
T2	23.31	23.67	23.54	23.56
T3	23.80	24.00	24.03	23.87

In the *experimental group* we also observed a statistically significant increase in the BMI of females compared to males and in the BMI of 12 years old compared to 11 years old subjects (see Table 3).

Table 3. Mean Values BMI (Body Mass Index) of Experimental Group differentiated on Gender and Age

BMI	Gender		Age	
	Male Mean	Female Mean	11 years Mean	12 years Mean
T0	22.31	23.28	21.97	23.38
T1	21.42	22.46	21.16	22.54
T2	20.46	21.33	20.14	21.43
T3	20.17	21.05	20.08	21.08

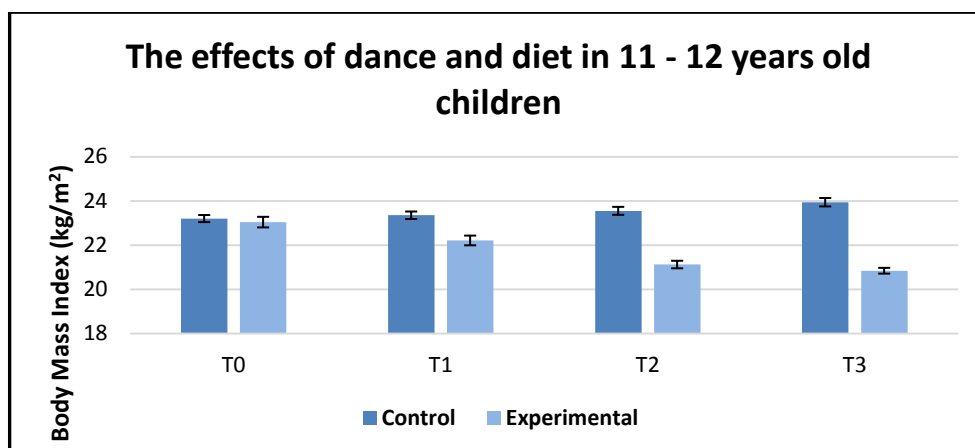


Fig. 1. The effects of dance and diet in 11 to 12 years old children over time (T0 = beginning of study, T1 = one month later, T2 = two months later, T3 = three months later).

Represented are the means and standard deviations of each group (Fig. 1.).

Conclusions

In the context of the rise of childhood obesity worldwide it is of paramount importance to study the best methods for prevention. Usually, a combination of diet and physical activity can be effective in both treating and preventing obesity. Our study focuses on the use of dance as a physical activity together with an appropriate diet. A virtue of this program based on dance is to more easily motivate the children in participating and thus being more likely to yield long-term results. Considering our findings (Fig. 1), we can conclude that a 1h30 minutes of dance, three times a week over a period of three months, doubled by a well-balanced dietary program designed to meet the nutritional requirements for children between 11 and 12 years of age leads to an important decrease in the total number of overweight children. It would be interesting to perform a follow-up study (after 5-10 years) with the same participants in order to see how many of the children in the experimental group who benefitted from the program remained in the normal weight category.

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THEORETICAL ASPECTS OF TRAINING PERIODIZATION IN SWIMMING

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Abstract. *Swimming has evolved into a sport that firmly requires long-term and short-term training plans to help athletes reach their full potential. The coach is responsible for preparing the swimmer for major championships and he must acknowledge that every day is a rehearsal for them. He has the important role to plan training and he must use his creativity, intuition, experience and knowledge in order to design an efficient plan. The development of new ways to evaluate certain types of training and access new information and technologies have created a large variety of methods from whom coaches should choose in order to achieve maximum potential. This paper aims to highlight some recent ideas regarding planning and periodization, which are critical elements of the training design. Long-term developmental objectives have a higher rate of accomplishment if they are foreseen and sought after with the help of meticulous planning. Periodization is not just the variation of the training parameters in order to achieve proper adaptation and increased performance, but it also gives coaches the opportunity to choose when swimmers will peak. Moreover, periodization can help prevent injuries and burnout.*

Keywords: *swimming, training, planning, periodization.*

Introduction

The swimming community is growing increasingly faster and it is connecting globally. Information is being transferred with tremendous speed and coaches, especially the young and inexperienced ones, have to face the challenge of filtering it. This becomes a critical problem when misinterpretations are made, when very little research is being done on the topic and when something open for discussion is taken for granted. Coaches will fail to help swimmers achieve their full potential if they forcefully and unjustifiably fit the swimmer to the program instead of fitting the program to the swimmers.

The purpose of this paper is to highlight some recent ideas regarding planning and periodization.

Proper planning and periodization are critical elements of the training design. Jan Olbrecht (2013) views the training plan as a “table of contents” that should list the following: the main competitions, the main conditioning/ mental/ technical improvements to be achieved, the expected evolution in performance, a general description of the swim and dry-land training, the number of training sessions and the total mileage per week, the tests to support and control the effectiveness of the training and non-sport-related commitments. He adds that the evolution of the swimmer’s conditioning is not a hundred percent predictable and that the training plans will be subject to modifications during the season according to successive evaluations. In Olbrecht’s opinion, a coach must first plan by collecting all the necessary ingredients (competitions, evaluation tests, types of training) to improve competition performance. After completing the planning phase, the training periodization step begins and it arranges, organizes, schedules and fixes the timing, as well as the duration of each type of training, testing etc. for one year according to the established objectives.

Alan Lynn (2008) considers that periodization can be defined as the division of the annual training plan into smaller and more manageable phases of training. He also thinks that, through periodization, each aspect of fitness can be properly addressed while maintaining the others.

Scott Riewald and Scott Rodeo (2015) point out that the two terms, “planning” and “periodization” are similar, yet not synonymous and proceeds to describe them as follows: planning incorporates elements of structure - establishing both short- and long-term training goals, as well as defining the path to take to achieve those goals, while periodization focuses on the methodology underlying the plan - the cyclical or periodic nature of manipulating the training variables, including rest, to optimize performance outcomes.

The authors consider that a fundamental principle of the training periodization is that the volume of training is increased before the intensity of training. This means that, in the beginning of each cycle or season, good aerobic fitness is prioritized during training. After the required level of endurance is reached, the training focuses on developing speed and anaerobic power.

Jan Olbrecht (2013) says that the first step in creating a *multi-year plan* is to delineate the building-up of the conditioning over several years. He recommends that the multi-year plan should consist of three phases with specific objectives: basic training, build-up training and top level training.

- The first phase (basic training) starts at about 10 or 12 years of age and lasts 4 years. The emphases of this phase are: general physical development, stroke technique and coordination, developing the swimmer's ability to assimilate the training load, learning the competitive rules and how to use the training material, as well as the swimmer's health status.
- The second phase (build-up training) starts at 14 years of age and lasts 3 years. This phase should lead up to peak form. Endurance and strength are mainly emphasized, but also the mental development such as willingness to go all-out, the dealing with setbacks or failures, the competitiveness, the concentration power and the desire for training.
- The third phase (top level training) corresponds to the highest level of competitive swimming. This phase starts somewhere between 17 and 19 years of age and has a minimum duration of 4 years. It is very different from the previous phases, in the sense that the objectives are almost entirely determined by the specific needs of each swimmer individually. In this phase, the technique is brought as close as possible to perfection and maximal development of physical abilities is reached.

Olbrecht adds that the multi-year plan must contain the following information: long-term competitions and performance goals, long-term technique and conditioning objectives, dry-land training, the number of training sessions per year, medical verifications and evaluations of conditioning.

When referring to multi-year training plans, Bill Sweetenham and John Atkinson (2003) claim that the training parameters (number of training sessions, type of training performed and training volume) should follow a progression based on age (physical maturity), ability and dedication to excellence.

The year plan will be designed in accordance with the multi-year plan and is a detailed description of what the next year of training will be. This plan takes into account the information collected about the swimmer's evolution in the past and connects it with the multi-year objectives. The year plan should mention what competitions the swimmer will attend and will highlight the important ones, with their corresponding performance objectives.

The most important part of the year plan is the training load, with detailed information regarding the periods of intensive or voluminous training, the periods of relative rest, the dominant types of training, the periods of practicing the technique and the number of weekly training units.

Training evaluations and medical testing will also be mentioned in the year plan.

Macrocycles refer to a long-term training phase lasting several weeks to months. Alan Lynn (2008) claims that, in swimming, this usually represents the entire season of preparation for a major annual competition, while Jan Olbrecht (2013) defines the macrocycle as being the training period around each peak form. The number of macrocycles may vary depending on the competition calendar. For Bill Sweetenham and John Atkinson (2003), the macrocycles are building blocks of the annual plan and generally last 12 weeks, 15 weeks or 24 weeks.

Macrocycles are divided in three different periods: the base training period, the competition training period and the transition period. The structure of the macrocycle is determined by the number and duration of training units per week, the total training volume per week and the volume and frequency per week of different types of training (Olbrecht, 2013). Modifications are inevitable, but it is important that they are made based on condition testing. In many situations, important swimming competitions are only 2 or 3 weeks apart. In this case, the coach will plan only one macrocycle to prepare the athletes for both of these top competitions.

The mesocycle is a short sequence within the macrocycle. Mesocycles are the most malleable units of periodization as the duration of a mesocycle may differ greatly. Alan Lynn (2008) highlights that mesocycles usually last from 7 to 20 weeks.

There is a large variety of mesocycles, depending on the requirements of the program, coach and swimmer.

According to Alan Lynn (2008), the types of mesocycle are the following:

- introductory cycle - general training, low volume - low intensity;
- preparatory cycle - transition from low volume - low intensity to higher volume;
- specific cycle - more specialized, higher intensity training with an emphasis on improving competitive speed;
- competition cycle - competitive performance on a single or repeated basis.

The microcycle should contain a detailed training program for a period lasting from a couple of days to one week. The general length of the microcycle is a standard 7-day training week. Alan Lynn (2008) highlights that coaches and swimmers are "creatures" of the modern working week and most swimmers have to fit their training programs around work, education and family commitments. Depending on the training objectives of the mesocycle, the microcycle or week plan has a structured content. The volume and intensity need to be properly scheduled and balanced for the super-compensation to take place even in periods of 2 or more daily training units.

The coach should take into account the following points in writing a week plan: sets or drills requiring fine and precise locomotion (such as sprints and learning or improving technique) must be performed in a relative fresh and fit condition, explosive strength training should be avoided in a tired or fatigued condition, substantial anaerobic lactic workouts should be restricted to 1, 2 or maximally 3 training sessions a week, depending on the swimmer's anaerobic capacity; regeneration training is the most important training in the competition period (Olbrecht, 2013). Higher intensity training results in less time spent in the pool, which means that shorter 2 to 4-day training cycles are used (Lynn, 2008). Alan Lynn (2008) describes a different approach to designing microcycles. By reducing the length of the classic 1-week micro to a 3-day micro, coaches can be more creative in certain situations. The first day will be focused on training endurance with a high volume and a low intensity in 2 or even 3 training units. The second day also has 2 training units, but the volume is reduced and the intensity is raised. In the third day, only one training session is scheduled. This training session is focused on low volume, high quality and very fast swimming.

A similar idea is suggested by Scott Riewald and Scott Rodeo (2015), who say that a microcycle should start at low to medium intensity and progress to higher intensity later in the microcycle.

Table 1. *Types of microcycles (Sweetenham and Atkinson, 2003)*

Type	Volume	Description
Preparation Training Microcycle	45-65 km	<p>It links rest periods with intensive training periods</p> <p>No individual medley work is done as straight individual medley</p> <p>All swimmers work single-stroke sets</p> <p>Medium volume of speed work</p> <p>Speed work can alternate between the start, middle and end of the training session (starts, turns, finishes, swimming from a push)</p>
Endurance Training Microcycle	60-80 km	<p>The main focus is increasing endurance</p> <p>High volume of training with moderate intensity</p> <p>Medium volume of speed work is done to maintain anaerobic capacities</p> <p>Speed work can alternate between the start, middle and end of the training session (starts, turns, finishes, swimming from a push)</p>
Quality Training Microcycle	50-65 km	<p>Individual medley work is done as straight individual medley</p> <p>Low volume of training with high intensity</p> <p>Maximum VO_2 and critical speed training are introduced as full sets</p> <p>High volume of speed work</p> <p>Speed work can alternate between the start, middle and end of the training session (starts, turns, finishes, swimming from a push)</p> <p>The main set on the Saturday morning session is going to be race-pace training</p>
Mixed Training Microcycle	55-75 km	<p>It is a combination of the endurance and quality training weeks</p> <p>Medium volume of training</p> <p>Medium volume of speed work</p> <p>Speed work can alternate between the start, middle and end of the training session (starts, turns, finishes, swimming from a push)</p>
Specific Training Microcycle	40-55 km	<p>This microcycle focuses on preparing the swimmers in detail for the target competition</p> <p>Swimmers do more individual medley work as broken individual medley sets</p> <p>High volume of speed work</p> <p>Speed work can alternate between the start, middle and end of the training session (starts, turns, finishes, swimming from a push)</p> <p>Swimmers start practicing their competition pre-race warm-up</p> <p>This week can be used as competition simulation with heats, semifinals and finals divided throughout the training units</p>

A *training unit plan* has to be very specific and will contain all the specific training details. Each training unit is subordinated to the objectives and characteristics of the general planning.

It is general consensus that an effective training unit has several components: the warm-up, the preset, the main set and the cool-down. Jan Olbrecht (2013) suggests a five-component training unit with two main sets divided by a short regeneration exercise, which has the role to prepare the swimmers for the second set. He also gives three guidelines for determining the sequence of sets: sets or drills that are principally technical or coordination-oriented (sprints, stroke rate training) precede workouts intended to improve conditioning, speed exercises are completed before endurance exercises or strength training and working muscle groups should be alternated. The author states that experimental research has shown that the local regeneration of the stressed muscle is fastest if the muscle experiences the same type of movement as during the hard exertion, but with a low intensity. He also suggests that this should not happen during aerobic endurance training as the long duration of stress over the same muscles groups is essential.

Issues addressed

We think that the following definition of periodization is the most comprehensive: "periodization is the systematic and cyclical manipulation of training variables, including the proper prescription of rest and recovery, across a competitive season, as well as the athlete's career, to maximize performances while maintaining the athlete's long-term health" (Herodek, Simonovic and Rakovic, 2012).

Scott Riewald and Scott Rodeo (2015) suggest that it is the coaches' responsibility to understand both planning and periodization as this will help coaches develop programs that will allow swimmers to do the following:

- Set and achieve realistic performance goals within a season, as well as across longer, even multi-year time horizons
- Achieve peak performances at specific competitions during the season
- Provide variety to a training plan to increase enjoyment while helping to prevent performance plateaus
- Engage in age-appropriate and developmentally appropriate training in all stages of development, shifting the goals and training focus as a swimmer progresses from an age-group swimmer to a senior swimmer
- Achieve their true performance potential when they are physically mature
- Maintain health, as well as performance, while avoiding burnout and overtraining.

We consider that younger coaches who are just starting their careers should give greater importance to planning and periodization by investing more time in the study of the theoretical aspects. Information regarding this topic can be obtained with ease. Once the information is available, the next step is to create adequate training plans for their swimmers. This process should start with the plan that has the longest time frame and they should work their way through to the smallest element of planning. Starting with age-group swimmers, methodical planning for the future is indicative of success. Long-term developmental objectives have a higher rate of accomplishment if they are foreseen and sought after with the help of meticulous planning.

Conclusions

When designing a training program, the coach has to respect some basic principles. He should start creating the training plan with the end in mind and then structure it down to the smallest elements. Periodization is not just the variation of the training parameters in order to achieve proper adaptation and increased performance, but it also gives coaches the opportunity to choose when swimmers will peak. Moreover, periodization can help prevent injuries and burnout.

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PERIODIZATION OF VO₂MAX AND RESTING METABOLIC RATE TEST, WITH ELITE FEMALE ROWERS OVER THE PERIOD OF TWO YEARS

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Abstract. *This paper, it's showing the importance of monitoring the adaptations and the improvement of VO₂max through specific aerobic exercise. The study was done through monitoring of a group of 19 elite female rowers between April-November 2015 in Brasov county and Silistea Snagov, Romania. Two VO₂max and Resting Metabolic Rate tests were carried out in the period mentioned. The first test was initiated during the pre-competitive racing season 2014-2015, while the second test was performed during the general training period 2015-2016. Functional cardiovascular and respiratory parameters were studied, indicating the athlete's progress. The following conclusions were obtained: the manipulation of the lower aerobic effort, has been associated with the increased lung capacity, validated through the following monitored parameters: VE/VO₂, VE/VCO₂, ventilatory thresholds, VO₂; establishing a direct influence on the progress report of the athletes and performances achieved during the specific maximal effort. Establishing a cyclic testing program, it showed important adaptations of the cardio-respiratory system of the athletes. This format of testing and monitoring it allowed the coach to make the appropriate changes within the intensities of trainings which made a 60% of the specific training zones with great benefits in adaptations.*

Keywords: *effort, aerobic, rowing, VO₂max testing.*

Introduction

The main objective of this was to estimate the maximum volume of oxygen used by athletes which is associated with a form of monitoring often established in endurance sports. Following the tests, the data suggest through cardiopulmonary assessment, the identification of the physiological factors limiting the general effort performed, establishing main differences between groups of athletes (Zinner et al., 2015). Thus, changes in VO₂ during the sustained activity will influence energy resource during the effort and the total time spent at a certain intensity (Bishop, Bonetti and Dawson, 2002). Imposing an increased respiratory frequency will develop the body's adaptation through current volume, respectively through the process of loading and unloading CO₂ expiration/ O₂ expiration under a respiratory cycle in order to maintain body homeostasis (Wasserman et al., 2005, pp. 10–65).

VO₂ value and heart rate variability evolution in the activity of elite athletes will play an important role in quantifying the competition results. As a result, the validity of such testing protocols, will impose physiological variability, effectiveness and information regarding the adaption of the individual effort scheduled within the racing season (Stavropoulos-Kalinoglou et al., 2013).

Materials and Methods

An observational study was conducted after obtaining verbal acceptance from the athletes to participate in this study. The athletes performed a specific rowing maximal effort, on the concept 2 ergo meter, action during which gas exchange values were monitored.

Two VO₂max tests were carried out in the period mentioned. The first test (T1) was initiated during the pre-competitive racing season 2014-2015 (study group of 19 female rowers), while the second test (T2) was performed during the general training period 2015-2016 (study group of 17 female rowers of the total of 19 included).

The tests were performed through Cosmed Quark CPET equipment (Rome, Italy) and Concept 2 ergo meter (USA). The heart rate was monitored through ANT+/ Bluetooth heart rate monitor made by Cosmed. The equipment was calibrated at the start of each test with O₂ concentrations of 16% and 2% CO₂. The turbine was calibrated with a 3 L syringe at the beginning of each test. Athlete's preparation for the testing activity, characterized through maximal effort, was achieved through specific warm up for 20 minutes, specific functional adaptation and growth potential effort by simulating activity on ergo meter at a heart range between 120-175 b/min. In performing the effort, the following parameters were studied: HR (heart rate), RER (respiratory exchange ratio), VE (ventilation), VE/VO₂ (ventilator equivalent for oxygen), VE/VCO₂ (ventilator equivalent for carbon dioxide), VO₂ (maximum volume of oxygen), VO₂/kg (maximum volume of oxygen reported per kg), VT₁

(ventilatory threshold 1), VT₂ (ventilatory threshold 2), PetO₂ (tidal fraction of oxygen) PetCO₂ (tidal fraction of carbon dioxide) METS (metabolic equivalents), CHO (carbohydrates consumption), fat (fat consumption), EXP(expiration) T1(test 1),T2(test 2).

For the statistical analysis we used Graph Pad Prism 5.0. software in order to analyse the monitored data. The used statistical indicators were standard deviation (SD) and the coefficient of variation (CV). Exposure of the data was performed by mean and median value. The Pearson correlation, with 95% confidence interval, was used to identify a statistical connection between two different parameters. The level of statistical significance was $\alpha \leq 0.05$.

Table 1. *VO₂max and resting metabolic rate proposed periodization for competition season 2015-2016*

No.	Date	Test	Objective	Observations
<i>Competition season 2014-2015</i>				
1.	04.2015	VO ₂ max Test	Ventilatory thresholds	Distance: 2.000 m
2.	06.2015	RMR Test	Functional adaptations of the athletes to trainings	-
<i>Competition season 2015-2016</i>				
3.	11.2015	RMR test	Functional adaptation of the athletes to trainings	-
4.	11.2015	VO ₂ max Test	Ventilatory thresholds	Distance: 2.000 m
5.	01.2016	VO ₂ max Test	Ventilatory thresholds	Distance: 2.000 m
6.	03.2016	RMR Test	Functional adaptation of the athletes to trainings	-
7.	06.2016	VO ₂ max Test	Ventilatory thresholds	Distance: 2.000 m

(VO₂max Test – Maximum volume of Oxygen test; RMR Test –Resting Metabolic Rate)

Results

Athletes adaptation it is obvious considering the time improvement over the 2000m all out test! Our evaluation of the physiological parameters shows improvements of the VO₂max. The higher VO₂/kg maxim achieved was going hand in hand with the improvement of the time obtained by the athletes over the distance of 2000m. So, for the 1st test, in 04.2015, we had a median of 46.25 ml/kg, without having a statistically differences comparing it with the 2nd test, in 11.2015 (*p=0.1484, r=0.745, IC95%=-0.400 to 0.981), with a median value of 50.98 ml/kg, respectively 01.2016 (*p=0.1474, r=0.608, IC95%=-0.267 la 0.933) with a value of 49.79 ml/kg but with a difference statistically positive ($p=0.0036$, $r=0.917$, $IC95\%=0.531$ la 0.988) comparing it with the test from 06.2016, where the value was 49.67 ml/kg, with changes of the minimum value and maximum values of VO₂max. You can see this in the table number 2.

Table 2. *Changes in VO₂max (ml/min/kg) median±interval for W8+, season 2015-2016*

BOAT	Parameter	Test date	Median value	Minimum value	Maximum value
W8+		04.2015	46.25	45.35	49.99
		11.2015	50.98	47.04	54.99
		01.2016	49.79	45.50	54.14
		06.2016	49.67	46.15	56.33
W2-	VO ₂ /kg (ml/kg/min)	04.2015	49.81	45.95	53.66
		11.2015	54.99	-	-
		01.2016	50.77	49.65	51.88
		06.2016	52.23	48.13	56.33
LW2x		04.2015	56.50	54.87	58.13
		11.2015	55.53	54.78	56.27
		01.2016	64.07	-	-
		06.2016	58.84	56.94	60.73

(VO_2/kg - Oxygen Volume in mililiters by kilogram by minutes)

Fat metabolism was decreasing in the month of 06.2015 , without having statistically differences compared to the test from 11.2015 ($p=0.3279$, $r=0.672$, $IC95\%=-0.924$ la 0.980), respectively 03.16 ($p=0.7802$, $r=0.780$, $IC95\%=-0.327$ la 0.984). In the same time carbohydrates metabolism was increased in the period of 06.2015, being associated with the beginning of monitoring phases (as you can see in Table number 3).

Table 3. *Changes of energetic metabolism throughout the seasons 2015-2016 (RMR)*

Boat	Parameter	Test date	Median value	Minimum value	Maximum value
W8+	EEt (kcal/day)	06.2015	2050	1823	2304
		11.2015	2148	1884	2349
		03.2016	2207	1932	3655
W2-	EEt (kcal/day)	06.2015	2561	1932	3189
		11.2015	2059	1884	2233
		03.2016	1935	1823	2046
LW2x	EEt (kcal/day)	06.2015	1858	1783	1933
		11.2015	1777.38	-	-
		03.2016	2611	2475	2747
W8+	Fat (%)	06.2015	37.66	2.18	45.41
		11.2015	44.25	30.85	62.78
		03.2016	53.44	34.30	70.83
W2-	Fat (%)	06.2015	45.87	35.52	56.22
		11.2015	37.64	33.99	41.29
		03.2016	47.27	44.49	50.05
LW2x	Fat (%)	06.2015	46.65	35.22	58.07
		11.2015	54.45	-	-
		03.2016	48.37	43.76	52.98
W8+	CHO%	06.2015	62.82	55.11	97.94
		11.2015	56.29	37.71	69.68
		03.2016	47.09	29.70	66.23
W2-	CHO%	06.2015	54.66	44.31	65.01
		11.2015	62.89	59.24	66.54
		03.2016	53.26	50.47	56.04
LW2x	CHO%	06.2015	53.88	42.46	65.30
		11.2015	46.05	-	-
		03.2016	52.16	47.55	56.76

(EEt – energy expenditure ; Fat – fat metabolism; CHO – carbohydrates metabolism)

The trainings during the monitoring phases were in line with the competition objectives. So, the 1st test was associated with the pre-competitive season of 2015, while the 4th test was done in the pre-competitive season of 2016. The main modifications sustained statistically as a comparison of the 2 periods which would lead to the competition expectations, can be seen in the Table number 4.

Table 4. *Main changes throughout the study within the main parameters, associated with high performances (W8+boat)*

Median values	Statistically results
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Parameter	04.2015	06.2016	<i>p</i>	<i>r</i>	Confidence interval 95%	
					Lower	Higher
Time	391.2 s	387 s	0.0003	0.951	0.846	0.983
VT ₁	155 b/min	166.5 b/min	*0.8788	-0.0648	-0.736	0.670
VT ₂	181 b/min	182.5 b/min	0.0132	0.817	0.265	0.965
VO ₂ /kg	46.25 ml/min/kg	49.67 ml/min/kg	0.0036	0.917	0.531	0.988
FC _{max}	185 b/min	184.5 b/min	*0.8372	0.096	-0.708	0.792
VT	2.22 l/min	2.08 l/min	0.0073	0.889	0.412	0.983
RER	1.08	1.03	0.0241	0.819	0.173	0.972
PetO ₂	108.5 mmHg	110.2 mmHg	0.0051	0.904	0.474	0.986
PetCO ₂	39.22 mmHg	37.78 mmHg	0.0020	0.935	0.616	0.990
Fat	6.98%	9.35%	*0.2419	0.510	-0.394	0.912
CHO	93.12%	90.78%	*0.2419	0.510	-0.394	0.912

Note: (VT₁ – 1st ventilatory threshold 1; VT₂ – 2nd ventilatory threshold prag; VO₂/kg – Maximum Oxygen volume by kilogram; FC_{max} – Maximum Heart rate; VT – tidal volume; RER – respiratory exchange rate; PetO₂ – end-tidal Oxygen tension; PetCO₂ –end-tidal carbon dioxide tension; Fat – fat metabolism; CHO – carbohydrates metabolism).

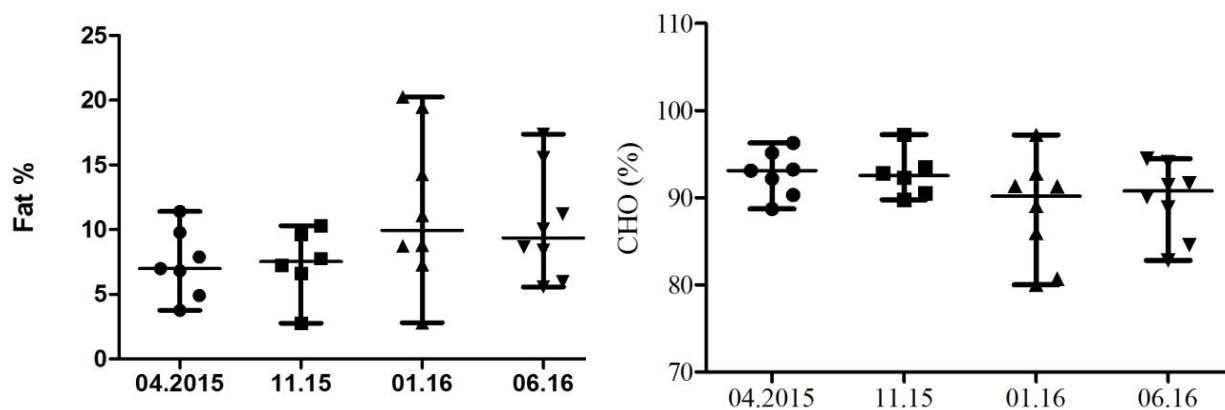


Fig. 1. Changes in fat metabolism and carbohydrates metabolism from test no. 1 (04.2015) to test no. 4 (06.2016) for W8+

Discussions

The results obtained in this paper validate the hypotheses proposed according to which the individualization of aerobic exercise contribution in daily elite athletes training may impose functional changes in the evolution of specific physiological adaptation during maximal effort.

It is noted that most of the studies conduct activities aimed on the biomechanical and physiological development of body elements, and less on information regarding energy metabolism elements (Hill and Davies, 2002). Thus, the body's physiological evolution, and the total quantity of oxygen that can be used by the body will be influenced by the maximum volume of oxygen (Helgerud et al., 2007) recorded in the effort performed through the two tests carried out. From this point, the total amount of oxygen taken up by the body will facilitate the adaptation of the body through metabolic balance (Martin et al., 2016).

VO₂ fraction it's facilitating the growing contribution of oxygen, which is often associated with the respiratory frequency, determining the evolution of the ventilation, and RER (Ramos-Jimenez et al., 2008), elements associated statistically significant within T2 versus T1. Respiratory system efficiency, by aerobic effort contribution is confirmed by the data for ventilation and discharge rates of carbon dioxide (Arena et al., 2004), being reported as a direct influence on the result of the final computational evolution, as in T2.

At the same time, supporting a maximum effort will require increased VE, representing a level associated with an inability to satisfy the demands imposed through effort which is possible to reduce the oxygen tidal fraction

(Johnson et al., 1996; Forman et al., 2010), and to limit the development of effort, as in T1 testing. Thus, in separate cases such as T2, it will decrease the elimination rate of carbon dioxide being reported an increase in muscle activity, maintaining carbon dioxide fraction in the blood. Action which is described as a constant action associated with the efficiency of the respiratory system (Bernardi et al., 2014; Arena et al., 2004). Increased oxygen consumption in T1 respectively T2, by increasing the frequency of breathing during exercise will assign a proportional increase in the production of CO₂, through this action, limiting the total amount of oxygen which will reach the alveoli (Bussotti et al., 2008). Proportional increase of CO₂ will not set a stationary level which will influence the energy metabolism through the direct relationship with PetCO₂ respectively PaCO₂ (George, Sen and Raveendran, 2014), setting the final percentage of energy metabolism contribution during exercise. Action, studied in this paper, which was insignificant statistically in T1-T2 testing periods.

Conclusions

Establishing a cyclic testing program, it showed important adaptations of the cardio-respiratory system of our athletes. This format of testing and monitoring it allowed the coach to make the appropriate changes within the intensities of trainings which made a 60% of the specific training zones with great benefits in adaptations.

In the season of 2015-2016 the total increase in lower aerobic effort, and higher aerobic effort was significantly higher than the effort performed during the 2014-2015 competitive season. This aspect, through data monitoring, had associated increased lung capacity, validated through the following monitored parameters: VE/VO₂, VE/VCO₂ respectively VT, VO₂; establishing a direct influence on the reported progress, and performance achieved by the athletes during the specific maximal effort. Conclusive data to that effect the individual aerobic capacity during maximal effort. The proportion of VO₂/kg was associated with the development, and value of the ventilatory thresholds determining their influence on the evolution of the athlete within a maximal effort.

Conflict of interests

The authors of this paper do not have any conflict of interest concerning the study group, method and the results obtained in this study.

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THEORETICAL ASPECTS REGARDING THE MORPHOFUNCTIONAL CHARACTERISTICS OF THE RUGBY PLAYERS FROM THE ROLLING COMPARTMENT

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Abstract. Over the past decade, sport, and rugby in particular, has evolved a great way. Therefore, those involved in the performance have to be as precise and effective as possible in selecting the training means and methods, in order to obtain results in an optimal time and not to jeopardize the evolution of the players due to injuries. If, until a few years ago, training teams with many players was a problem, especially in terms of physical training, nowadays, thanks to many researches in this field, we know the distinctiveness of effort in regard to preparation for high performance, as well as to have clear guidelines when selecting high level players. Power and anaerobic endurance are undoubtedly the dominant biomotor abilities for every position, without mentioning that aerobic endurance is fundamental for every position. Although power has a great significance for all positions, modern rugby alternates high intensity situations with low intensity situations or even short breaks, this representing an advantage.

Keywords: rugby, anaerobic endurance, power.

Introduction

The analysis of the morpho-functional particularities of each position is done during a game and it concerns its specificity. A rugby match lasts for 80 minutes, during which high-intensity activities, such as sprints, quick changes of direction and rucks, are alternated with low-intensity activities, such as walking or jogging (Gabbett, Jenkins and Abernethy, 2011).

During a game, the 15 team members do not make the same effort, because there are quick, maximum-intensity actions around the ball, low-intensity actions for those located opposite the ball and repositioning actions for the following phases of the game. Through the specificity of the game, while analysing what the effort of each position is, we start from the assumption that all players have a well-developed aerobic base, in order to maximize the recovery time between phases (Bompa and Claro, 2009).

Content

We start with the general analysis (Table 1), and then we analyse, according to each position, the specific actions, from a physical point of view, rather than a technical one.

Table 1. *The analysis of effort for forwards, according to Bompa and Claro (2009)*

Position	Ergogenesis	Biomotoric abilities	Minimal somatic characteristics
		Forwards	
Props	- alactic: 60% - lactic: 40%	- strength - power, power-endurance - short sprint – reaction speed	Weight 94.3±14.1 kg Height 177.8±5.4 cm Body Fat 12%
Second row	- alactic: 60% - lactic: 40%	- strength - power, power - endurance - jumping power endurance - starting power	Weight 86.9 ±9.4 kg Height 188.6±6.3 cm Body Fat 12 %
Loose forwards + Hooker	- alactic: 30% - lactic: 70%	- strength - power, power - endurance - acceleration - deceleration - starting power - speed, speed endurance	Hooker Weight 79.3 ±6.1 kg Height 175.3±2.1 kg Body Fat 11 % Loose forwards Weight 80.9±7.3 kg Height 181.7±3.6 cm Body Fat 10 %

First Row – Prop and Hooker

The Prop

The main trait of this position is to always lead the team forward. It is a position represented by power, the essential actions being executed in scrum and lineouts. Also, according to World Rugby, it has an action rate of 40 rucks and approximately 15 mauls. In a scrum, the Prop has to form a solid base in order to dominate his adversary, both technically and physically, and to create a powerful shock and push his adversary. Physical domination of adversaries will increase the quality of the ball, which is why the pas should have a high quality and precision (Conquet, 1996). In lineouts, the main goal is to lift jumpers in alignment, to protect them and the ball, as well as to continue the action after the ball is won or not, by acting promptly with an aggressive defense. In the modern game, the key elements of the open play are represented by fast movements and aggressive pressure against the opponents, in order to maintain or recover as many balls as possible. They have to reach the contact zone fast and to develop a superior speed during the first 10 meters of an action. The ruck and the maul are the main roles of this position, described by low positions around the ruck and strong lower body, to contest the ball.

When playing in defense, it is important to perform rapid actions in order to put pressure on the offense and to contest every ruck, scrum, lineout or maul in order to regain the ball.

When playing in offense, they have to run fast and effective, to prevent creating open spots between them and the other players. They also have to provide support as fast as possible during free kicks. They have to understand the game play, how to implement it and to be as aggressive as possible on the defense line.

Physically, they have to develop their specific strength, with emphasis on the torso, neck, arms and legs, power, endurance and speed on short distances (10 – 15 m). Some of the actions they have perform are pushing in the scrums, lifts in the lineouts and ground combat skills.

The restrictive factors of this position are maximal force, power-endurance and the ability to accelerate. Also, the effort is 60% anaerobic alactic and 40% lactic (Bompa, 2006).

According to the most recent research in this field, the requirements of this position during a game, regarding effort, are:

- The distance covered throughout a game – 4.45 km.
- The average speed on the covered distance – 63.04 m/min.
- The distance covered under 12 km/h – 3.15 km.
- The distance covered over 18 km/h – 0.15 km.
- The maximum speed in km/h – 23.5 km/h.
- The average speed – 3.75 km/h.

The Hooker

The main actions of this position are similar to those of the prop, the difference being in the mobility the hooker needs to have in an open play, him being a key player in transferring the ball.

The hooker is seen as a leader and organizer of the scrum, he puts the ball in the game, communicating the most with his teammates in order to build a solid scrum. He has to be able to analyze quickly, so that he can adapt each scrum according to the opponents. His major role in the lineout when his team has possession is to throw the ball with optimal precision and speed for a successful action, and in defense his role is to protect the area between the goal and the 5 m line in order to prevent the opponent from passing through. During free kicks, he has to reposition himself fast, to transfer the ball in the open play. His mobility in the open play is used to put pressure on the opponents, to reestablish the attack line and to confuse the other team's defense. He needs to be present in the contact area at all times, to have quick reflexes and a low position during all moments of the game.

Physically, he has to develop his specific strength, with emphasis on the torso, neck, arms and legs, power, endurance and speed on short distances (10 – 15 m). Some of the actions they have perform are pushing in the scrums, lifts in the lineouts and ground combat skills.

The restrictive factors of this position are maximal force, power-endurance and the ability to accelerate. Also, the effort is 50% anaerobic alactic and 50% lactic.

According to the most recent research in this field, the requirements of this position during a game, regarding effort, are:

- The distance covered throughout a game – 4.45 km.
- The average speed on the covered distance – 63.04 m/min.
- The distance covered under 12 km/h – 3.15 km.
- The distance covered over 18 km/h – 0.15 km.

- The maximum speed in km/h – 23.5 km/h.
- The average speed – 3.75 km/h.

Second Row

The major role of the second row is to support the front row during a scrum, both in defense and in offense, acting as a second shield in the open play. They are active in defense and their objective is to cover as many spaces as possible and to provide support for the first row. Together with the first row, they represent the base of the scrum, and thus, they all have to cooperate optimally, in order for the synchronizing to be done within the maximal parameters. The body position is essential during a scrum, as well as the coordination on the hit, the pressure and maintaining the pressure when pushing. In lineouts, they are the ones that jump in alignment, and those who win recover the ball or disturb the opposition lineout. During kick-offs, they are usually the catchers.

During the open play, they have to transfer the ball quickly and to decide what is the right thing to do, their strong point being providing the attack with the quality ball. In defense, they have to get out swiftly. Their defense needs to be aggressive and they have to reposition immediately where it is needed.

Physically, they have to develop core and specific strength, with emphasis on the legs, short and medium distance sprints, coordinating actions that require jumps, recovering and releasing balls. Some of the actions specific to this position include: jumping in alignment, pushing in scrums, gripping and binding and ground tackling.

The restrictive factors of this position are power-endurance, acceleration and deceleration. Also, the effort is 60% anaerobic lactic and 40% alactic.

According to the most recent research in this field, the requirements of this position during a game, regarding effort, are:

- The distance covered throughout a game – 5.25 km.
- The average speed on the covered distance – 63.75 m/min.
- The distance covered under 12 km/h – 3.97 km.
- The distance covered over 18 km/h – 0.16 km.
- The maximum speed in km/h – 25 km/h.
- The average speed – 3.85 km/h.

Loose forwards unit

Blind side flankers

The major actions of this position are represented by supporting the ball carrier in order to provide continuity in offense and anticipating the weak points of the opponents. In modern rugby, they can be jumpers in the lineout, offering multiple options to gain as many balls as possible. The blind side flanker can be an all-around player, but it is important for him to analyze the game, to make the decisions, to cover the areas he is responsible for, to speed up the game and always cross the defense line. He represents a decision maker and has to always think where he will develop each action. During a game, they undertake around 45 or 50 rucks and mauls, they jump in lineouts, push in scrums and act as pivots during attacks.

In the modern game, they are like sprint athletes, good and powerful jumpers, to diversify the game. In defense, they are mobile players, providing an aggressive defense and being good runners on medium and long distances. It is essential for them to cover the inside area and the back of the scrum, their goal being to attack and recover the ball quickly, by anticipating each move.

The goal of the #6 flanker is to provide continuity to the game and speed and penetration power to the team. In defense they are good organizers of the defense line, with an impeccable tackle technique, and play an important role in always supporting the ball carrier.

Physically, flankers have to possess power endurance, speed and agility, with emphasis on legs, arms, coordination, acceleration and deceleration.

Some of the actions specific to this position include: multiple sprints, jumps, pushing in scrums, catching the ball and ground tackling.

The restrictive factors of this position are power-endurance, acceleration and deceleration. Also, the effort is 70% anaerobic lactic and 30% alactic.

According to the most recent research in this field, the requirements of this position during a game, regarding effort, are:

- The distance covered throughout a game – 5.88 km.

- The average speed on the covered distance – 63.06 m/min.
- The distance covered under 12 km/h – 4.05 km.
- The distance covered over 18 km/h – 0.41 km.
- The maximum speed in km/h – 27.55 km/h.
- The average speed – 3.95 km/h.

Open side flankers

Their role is similar to the blind side flankers' role, the difference being that #7 is an important ball carrier, providing continuity to the game, and having to anticipate the opponents' actions, succeeding in passing the defense line in attack and remake the line quickly in defense.

#7 is a good, fast and powerful athlete, playing an important role in making decisions in many moments of the game. Their role in the scrum is to organize the loose forwards, to help push and communicate.

In attack, they are powerful ball carriers, being a decisive factor in penetrating the defense line and permanently supporting their teammates. In defense, they are capable of covering large areas and adapting rapidly to new situations (Kelly and Coutts, 2007).

Physically, flankers have to possess power endurance, speed and agility, with emphasis on legs, arms, coordination, acceleration and deceleration. Some of the actions specific to this position include: multiple sprints, jumps, pushing in scrums, catching the ball and ground tackling.

The restrictive factors of this position are power-endurance, acceleration and deceleration. Also, the effort is 70% anaerobic lactic and 30% alactic.

#8

#8 is part of the loose forward unit, most of the times being its coordinator, acting as a connection between the scrum-half and the backline. He can be a good jumper and lifter in lineouts and has a good passing technique.

In attack, he supports the flankers and has to provide optimal solutions for the continuity of the game, being a decision maker and having a strong tactical involvement. In defense, he is strong and aggressive, with heavy tackle count, very tenacious and a good field leader.

Defensively, his actions are similar to those of #7. Physically, he has to possess power endurance, speed and agility, with emphasis on legs, arms, coordination, acceleration and deceleration. Some of the actions specific to this position include: multiple sprints, jumps, pushing in scrums, catching the ball and ground tackling.

The restrictive factors of this position are power-endurance, acceleration and deceleration. Also, the effort is 70% anaerobic lactic and 30% alactic.

Conclusions

Following the analysis of the positions, we can point out that power and anaerobic endurance are undoubtedly the dominant biomotor abilities for every position, without mentioning that aerobic endurance is fundamental for every position. Although power has a great significance for all positions, modern rugby alternates high intensity situations with low intensity situations or even short breaks, this representing an advantage. Forwards will have more intensity alternating actions, while backs will have more high intensity moments.

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CREATIVITY IN TEACHING PSYCHOMOTRICITY DURING EARLY CHILDHOOD EDUCATION

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Abstract. Recent scientific research has demonstrated the importance of harmonious physical and psychological growth in the first years of life which in turn has determined the development of a series of principles of education. The game corresponds to the child's need of movement and of creation. Early childhood education from 3 to 6-7 years, as a first stage of preparation for formal education, assures the integration of children in the compulsory educational system (around the age of 6 years) by building their capacity to learn. Nursery, as a formal education service, provides the environment that guarantees the safety and health of children and while taking into account the psychological characteristics of children, involves both family and community in the learning process. Storytelling is the best form to present movement activities organised with preschoolers. Psychomotor activities greatly benefit in value and efficiency if the teacher presents the game which is to be carried out as a little story with elements linked logically and elements familiar to children on the basis of their day to day experiences.

Keywords: creativity, early childhood education, motion game, psychomotricity.

Introduction

In a general sense, education is the process through which the crystallisation and development of human personality is realised. It is a specifically human activity carried out in the context of human social existence and it is at the same time a specific social phenomenon, an attribute of society, and a condition of human perpetuation and progress (Nicola and Farcaș, 1993, p. 87).

The spectacular progress of human civilisation and the informational boom have had an effect upon the Romanian preschool educational system, in the past decade the educational content, the methodology and teaching strategy being subject to continuous transformation and development. Thus, new concepts of particular relevance and importance to teachers' activity have been advanced: „early childhood education”, „child-centred education”, „learning by discovering”, „emotional intelligence”, and „educational partnership”.

The early education of children from 3 to 6/7 years, as a first preparatory stage to formal education secures the introduction of children into compulsory formal education (usually around the age of 6) by forming their capacity to learn. „Investing into early education is the most profitable investment in education”, as shown in a study developed by Cuhna, a Nobel Prize laureate in Economics (MECTS, 2008, p. 6). Early learning increases later learning opportunities. The skills and knowledge acquired earlier fosters the development of new abilities later, while knowledge and skills gaps produce greater deficiencies in time, as well as missed learning opportunities or poorly exploited ones.

Nursery school, as a formal education service which while taking into account the psychological characteristics of children assures for them an environment of safety and wellbeing, is a system that involves both the family as well as the community as a whole through the process of learning.

As specific and distinctive characteristics of early education, we would like to mention the following:

- The child is unique and her/his education must be holistic (comprehensive in all aspects of her/his development);
- At young ages it is essential to have a multidisciplinary approach (including care, appropriate nutrition and education);
- The adult/educator assumes within the “teaching” relationship a complex role as mature playing partner who knows all the details and rules of the game which need to be observed and respected;
- The activities undertaken within the educational process are real situational learning opportunities;

The instructive-educational process implemented in nursery school, through its content and pursued objectives is an important means of stimulating and developing the latent creative potential of children. All activity fields, starting with the game and finishing with physical education, constitute means of activating creativity. The theory and practice of physical education (PE) at preschool level have known a continuous development. If in the beginning PE has been subordinated to narrower purposes, being regarded simply as a form of pastime after a

more intellectually intense activity, our current educational ideal involves an understanding of physical education as an indispensable component with its own contribution to the child's personality development.

As such, PE contributes to the functional development of the nervous system, assuring favourable conditions for activities of an intellectual nature. Moreover, it also plays an important role in forming and educating the consciousness and moral conduct, in forming positive traits of will and character (such as courage, determination, perseverance and firmness).

Motility development is closely linked as well with the development of language skills, of cognitive processes, and of social and emotional competences. Both basic and fine motility, as well sensory-motor coordination represent ways of conquering the environment, but also of discovering and being aware of one's own body. The children's capacity to involve, coordinate and control the muscles and the body parts in achieving from the most basic to the most complex movements require time, exercise and support. From walking, running, jumping, climbing, rolling to the achievement of more complicated exercises such as utilising instruments for writing, drawing and cutting or movements involved for dressing involve a process filled with trials but also successes if the child is being offered the needed support.

Creativity in the psycho-motor activity within early education is considered as being a requirement in the wider sense which refers to the identification of ideas, solutions, problems, methods which are not new to us in the educational act, but which we have reached in an independent manner (the psycho-motor task is new only to the subject who participates to the activity) (Chiriță, 1983, p. 77).

Creativity in teaching psycho-motility in early childhood is accomplished primarily by arousing the curiosity, mood, interest and attitude of the pre-schooler through psycho-motor activities, and through a creative approach in teaching the movement game by using characters from stories. This represents our personal conceptual understanding of a modern educational system.

"CHILDHOOD IS MADE FOR PLAYING!", was said by psychologist Claparade (Nicola and Farcaș, 1992, p. 36).

The game corresponds to the movement and creativity needs of the child.

Through play, the child understands and knows reality. Her/his thinking has a global and intuitive character, in the sense that she/he perceives concrete aggregates, situations which are poorly differentiated, and she/he is not yet capable of analysing and synthesising, no able to describe and narrate using logical criteria. But she/he will use fiction and will invent, then she/he has the tendency of believing that beings and objects exist for her/his own use and understanding.

"By constantly inventing, the child invents itself bit by bit!" – Lengrand (Nicola and Farcaș, 1992, p. 37).

Storytelling is the best means within motility activities undertaken with pre-schooler groups, and exposure of children by teachers to basic motor skills (walking, running, jumping) to be acquired, included in a small story with logically linked elements known to the children in their daily lives, provide psycho-motor activities both value and efficiency (Golu, Zlate and Verza, 1993, p. 93).

Topic addressed

The story surpasses the boundaries of real life and introduces the child in a fantasy world which through the fascination which it exercises over her/him, becomes the best master of psycho-motor learning. The stories represent a pleasant means of knowing the world, a subtle way of training which suggests through the illustrated examples and the moral judgements, means of becoming similar to the depicted characters: strong, healthy, hardworking, wise, honest, courageous, confident and altruistic.

The world of stories does not represent only a way to learn about the world, people, plants, animals, good or bad, it is also the basis through which the teacher combines fantasy, imagination and creativity with the acquirement of basic motor skills, essential during the first steps towards a robust health of pre-schoolers.

The thematic projects sustain the idea of a creative approach in acquiring of basic motor skills (walking, running, jumping) through the transposition of the lesson in a story. Themes such as "Yes, I want to grow up and to exercise frequently!" (acquiring the ability to walk), "The race of the happy little frogs!" (acquiring the ability to jump), "The enchanted little train", "The gifts' race" (transporting gifts), "The hikers" (walking on slopes), "The enchanted forest" (walking and running around obstacles), "Playing together with the winter fairy" (throwing towards a fixed target) are just a few of the hundreds themes which can make the field of psycho-motility attractive.

Conclusions

We consider that in general, the preschool age is very important in the development of children mobility and in the prevention of physical deficiencies, and by structuring physical education lessons in the form of stories we can create an optimal framework for the practice and interest towards physical exercises in early education.

As individual age and sex particularities have been object to change under the influence of modern civilisation factors (living conditions and opportunities, nutrition, technology etc.) so too the existing educational programmes can and must be improved.

Researchers consider as creative activity any individual conclusion reached by the child which, through personal efforts gets to understand something previously unknown to her/his experience.

Harnessing the creative psycho-motor activity can be achieved through a holistic approach needed for a modern early childhood education, in which the emphasis is placed on the development of capacities and of attitudes which are related to socio-emotional development (living and working together with others, managing emotions, respecting diversity), on the physical development (raw and fine mobility, but also health and healthy nutrition), on attitudes and learning capacities (curiosity and interest, initiative, persistence in activity, creativity) combined with academic competencies pursued in a traditional manner (in the field of cognitive development and of language and communication development). In order to reach this approach teachers are required to rethink the educational demarche.

This topic was further developed in the first report of the doctoral thesis, as part of the literature review.

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